The Newspaper of Information Systems Management
March 15, 1993, Vol. 27, No. 11, 148 Pages, $6/Copy, $48/Year

COMPUTERWORLD

Inside

UNIFORUM
The **Unix** world gathers this week to sample an open systems menu that emphasizes client/server software and interoperability with legacy systems. *Page 2*

NETWORK CONSOLIDATION
One year after launching a global effort to consolidate telecommunications and network systems, **Citicorp** has exceeded its original $50 million cost-savings goal by $10 million. *Page 6*

COMPUTERWORLD SPECIAL REPORT

RE-ENGINEERING
An exclusive *Computerworld* survey reveals that only one-third of companies now reengineering are attempting widescale redesign. Most choose low-cost projects. *Page 102*

IN DEPTH
Do vendor IS shops practice what their firms preach? Information systems chiefs at **IBM**, **Intel**, **Oracle**, **Sun**, **Novell** and **Microsoft** reveal their technology ups and downs. *Page 109*

Oracle GUI tools arrive

A single application said to fit all platforms

By Jean S. Bozman
NEW YORK

Oracle Corp. will perform a magic trick on a stage here when it announces a new integrated tool set today. It will show users how to transform their character-based programs running on dumb terminals into graphical user interface-based client/server applications that can run on a variety of workstations and PCs.

The tool set, called the Cooperative Development Environment, is expected to ship this summer, according to Oracle Chief Executive Officer Lawrence Ellison.

Users have anticipated the tool set for more than a year, and they already own some elements of CDE, including several Oracle computer-aided software engineering tools.

Two new products, Oracle Book and Oracle Browser, address online documentation and end-user database queries, respectively.

The CDE environment integrates all 14 Oracle tools by grafting them onto several layers of client/server software. The environment allows programmers to develop an application and to de-

Oracle, *page 10*

Pieces of the puzzle

Key modules in Oracle's Cooperative Development Environment:

Oracle Forms Version 4.0: An enhanced version of SQLForms.

Oracle Reports Version 2.0: A report writer adapted to support GUIs.

Oracle Graphics Version 2.0: A software layer that can import charts and other images into standard report forms.

Oracle Book Version 1.0: Allows users to incorporate video, scanned images and sound into shared electronic documents.

Oracle Browser Version 1.0: A data query tool supporting GUIs.

Oracle CASE Dictionary Version 5.0: A data repository.

Source: Oracle Corp.

SNA routing battle grows

By Elisabeth Horwitt
WASHINGTON, D.C.

IBM's Advanced Peer-to-Peer Networking and Cisco Systems, Inc.'s Advanced Peer-to-Peer Internetworking squared off in a battle of demonstrations last week. Each side argued that it had the most open, widely supported and commercially viable protocol for interconnecting SNA and TCP/IP devices over the same backbone.

Interviews with Interop '93 Spring attendees reveal that APPN is gaining ground rapidly among both vendors and users as a peer-to-peer follow-on to the Systems Network Architecture networking protocol that can support Transmission Control Protocol/Internet Protocol devices if necessary.

In contrast, APPI so far seems to have made little impression on its target market: companies that want to take advantage of APPN's advanced SNA routing and directory features without having to implement the complex protocol on their TCP/IP backbones.

"We will support APPN, but we're not sure about APPI," said Jim Tretter, telecommunications manager at Multifoods, a Wellfleet

SNA, *page 14*

IBM to extend database reach

By Johanna Ambrosio
SAN FRANCISCO

IBM will attempt to grab a piece of the client/server database market with tomorrow's expected announcements of a relational database that runs under AIX and a more distributed version of its mainframe-based DB2 software.

Other parts of the announcement, an IBM spokesman confirmed, include additional third-party support for its Information Warehouse data access architecture introduced in September 1991. Software vendors including Platinum Technology, Inc., Candle Corp. and Information Builders, Inc. will unveil tools, the spokesman said.

Still, some observers predicted that the company's battle for a slice of the client/server database pie will be difficult.

The company is essentially a late entrant into both

IBM, *page 16*

About 60% of Fortune 500 firms are building data warehouses or are planning to do so, consultant Bill Inmon said.

CA gives in, cuts encryption keys

By Thomas Hoffman
ISLANDIA, N.Y.

Responding to user requests, Computer Associates International, Inc. last week disclosed plans to remove all disabling code from its mainframe software.

The disablement feature will be replaced with an automated console messaging system that will notify clients if CA software is nearing licensing expiration or is being used outside of contractual parameters. The messaging systems will not cause system shutdown on the date of license expiration, as did the disabling code, said Sanjay Kumar, CA's senior vice president of planning.

Disabling — or encrypted — code is used by some software ven-

CA, *page 7*

Federal computing initiative

Critics seek guiding light, program input

By Gary H. Anthes
WASHINGTON, D.C.

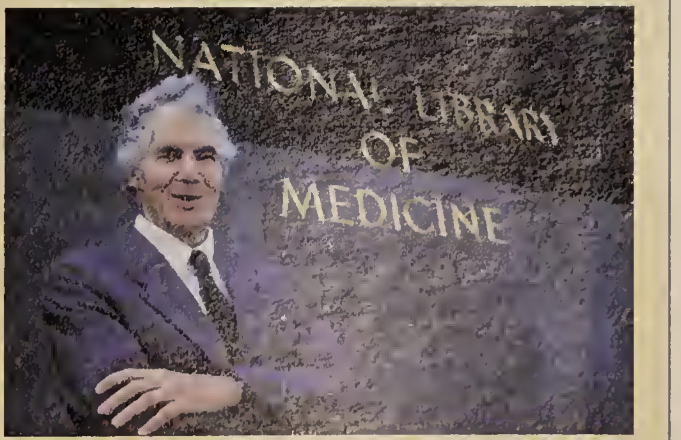
The federal government's advanced computing and communications initiative, long the province of a few high-tech agencies, is beginning to percolate into mainstream government. Along the way, it is finding applications unimagined by its founders a few years ago.

However, some observers say the High Performance Computing and Communications program lacks direction and consensus, despite enthusiastic pledges of support from President Bill Clinton and Vice President Al Gore.

The program was codified into law in 1991 under the sponsorship of then-Sen. Gore. Agencies involved at the onset were the Defense Advanced Research Projects Agency, NASA, the U.S. Department of Energy and the National Science Foundation.

Two key goals were to build parallel pro-

HPCC critics, *page 20*



Dr. Donald A. Lindberg, *HPCC coordinator, wants his office to be active in the advanced computing plan*

Newspaper

Robert Rubin is one of many executives who started small on a re-engineering project but expects some big results. Page 102.

NICK KELSH

In this issue

INTEROP

Attendees at last week's Interop '93 Spring saw Cisco and IBM, with APPI and APPN, respectively, engage in a battle of the internetworking demos. *Pages 1 and 14.* Casting its lot with IBM, Boeing taps Big Blue's MPTN to reduce the number of internetworking protocols. *Page 14.* Despite an overall compatibility theme, the show revealed that router interoperability is still in its infancy, while Novell users touted NetWare 4.0's ease of use and management. *Page 12*

MICROCOMPUTING

Desktop vendors continued to jockey for position last week as IBM, Apple, Motorola and others formed the PowerOpen Association to push the PowerPC RISC technology and lure software developers. *Page 16.* Separately, IBM and Compaq traded price cuts while PC software developers vied for IS loyalties with a variety of license and support options. *Page 4*

DEVELOPMENT TOOLS

Oracle finally unwraps its broad-based graphical tool set for client/server application development this week *(Page 10)* while Software AG rolls out a Unix-based tool set. *Page 24.* A busy HP, meanwhile, lined up support from 15 CASE vendors that agreed to target commercial Unix users by porting their tools to HP's SoftBench framework. The plan is to offer a "workable" open systems version of IBM's ill-fated AD/Cycle. *Page 10.* Working with Ellery Systems, HP also has a plan to make DCE migration a lot easier. *Page 8.* ASK is building a new generation of 'open' application development tools. *Page 10*

VIEWPOINT

Ease of use is still a goal and not a reality, says columnist Elaine Bond. That's why training has to be a priority. *Page 33*

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UniForum preview

Unix show highlights client/server

By Maryfran Johnson

SAN FRANCISCO

With an emphasis on the escalating corporate interest in open systems technology, the UniForum 1993 show opens here this week.

"The world of Unix is becoming ever more present in the world of data processing," said Donald Brungard, vice president of MIS at American National Can Co. in Chicago. "We have a corporate mandate to find out what it takes to downsize and provide interoperability between Unix-based platforms and mainframe-based platforms."

UniForum

Highlights of the show, which is expected to draw 40,000 attendees and more than 350 vendor/exhibitors, include the following:

- Microsoft Corp.'s first appearance at UniForum, where it will demonstrate the Windows NT operating system, which already has the Unix industry in a competitive uproar.
- Glimpses of new technology from firms such as Sun Microsystems, Inc., which will show off its upcoming 64-bit Scalable Processor Architecture, and Digital Equipment Corp.'s Unix clustering deal with Encore Computer Corp.
- Software products that stress multiplatform connectivity, graphical development tools and ways to run Windows or Apple Computer, Inc. Macintosh applications on Unix hardware.
- UniForum's first Technology Managers Conference, which has more than 100 information systems executives signed up to hear about client/server applications and tools in open systems environments.

James Holtman, vice president of technology architecture at Cincinnati Bell Information Systems in Ohio, will speak at the technology managers conference about building complex on-line transaction processing systems.

"When you have a number of legacy systems, one criterion in choosing these tools is the ability to run in multiple environments such as Unix, MVS and DOS/Windows," Holtman said. Tools that span several platforms are particularly important, he added, for users with large volumes of corporate data on proprietary mainframes and midrange systems.

Users from companies such as San Francisco-based Charles Schwab & Co., which is heavily committed to using Open Software Foundation technologies such as the Distributed Computing Environment (DCE), will be watching for DCE applications.

"I'll be real interested in DCE-enabling software and development tools," said Ken Richmond, senior technical lead at Schwab's software manufacturing group. "I haven't seen a lot of vendors' products for DCE yet."

One of the first companies with a commercial DCE application to show at UniForum is Atrium Technologies, Inc. Its Dazel distributed software product acts as a network delivery engine for Unix, Macintosh and DOS/Windows environments. Using DCE services, Dazel will automatically deliver information to printers, fax machines, electronic mail, voice and pagers.

Several users said they will watch for software products that improve access and interoperability between legacy systems and open systems. Object-oriented products are also likely to attract attention.

DEC will use Encore technology to build Alpha clusters

By Melinda-Carol Ballou

SAN FRANCISCO

Extending the reach of OSF/1, Digital Equipment Corp. will this week unveil its strategy for Unix-based Alpha clusters using technology supplied by Encore Computer Corp. in Fort Lauderdale, Fla., DEC sources said.

DEC will also use UniForum to make good on a promise to ship both OSF/1 and a range of Alpha AXP platforms running the operating system, sources added.

OSF/1-based Unix clusters will likely begin shipping in stages later this year, DEC sources said.

The agreement with Encore, details of which are expected to be made available this week, will allow DEC to incorporate Encore's Memory Channel Interconnect as the memory backplane for DEC's 7000 and 10000 class of Alpha AXP machines, according to DEC sources.

This initial implementation will target OSF/1-based platforms but is likely to apply to Alpha-based clusters on other operating systems later on, they added.

DEC will also use Encore's Integrated File System software, which acts as a traffic cop to allow files to be shared across the system and manages disk access.

Memory Channel is currently rated at 106M byte/sec. on Encore Infinity 90 clusters with effective data transfer rates of 98M byte/sec. The combined DEC/Encore effort on OSF/1-based clusters will offer effective rates of about 200M byte/sec., sources said.

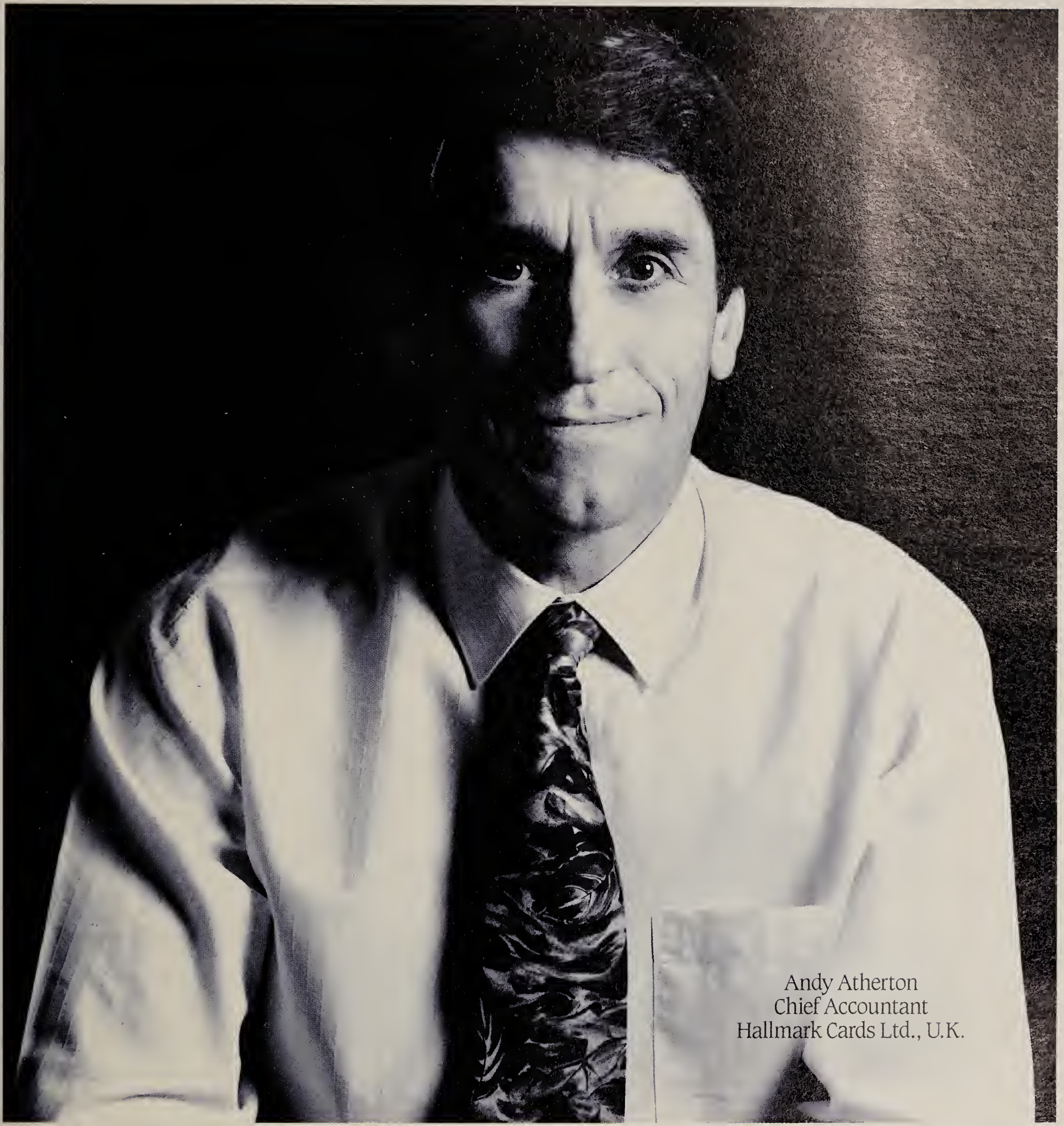
Because the nodes are tied together through shared memory, users are able to have near-linear scaling and direct node-to-node speed with very little latency.

These speeds leapfrog what is currently available on Unix clusters, according to industry analysts.

"You can see how piece by piece, the Unix world is trying to replicate the robustness of the proprietary world," said Bill Bluestein, an analyst at Forrester Research, Inc., a consulting firm in Cambridge, Mass. "The question is, what will be the cost of cluster licenses in the Unix world?"

Although pricing for the clusters was not yet available, the cost for the Alpha AXP line of systems on OSF/1 is identical to the pricing on Open VMS: starting at $14,995 for a low-end Model 3000 and ranging to $344,000 for a DEC 10000 on OSF/1.

DEC will also demonstrate a 200-MHz workstation said to run at 160 SPECmarks and a low-end desktop system. Both systems are expected to ship next month, sources said. The desktop system is expected to be priced slightly under $5,000.



Andy Atherton
Chief Accountant
Hallmark Cards Ltd., U.K.

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Make way for a faster dBase IV

By Michael Vizard
SCOTTS VALLEY, CALIF.

Borland International, Inc. last week made overtures to soothe restless dBase IV customers by delivering a substantially faster version of the product.

In addition, Borland made good on Ashton-Tate Corp.'s promise to deliver a dBase compiler for DOS that will allow applications to be widely deployed without incurring royalty fees.

"This is the first time I've ever been able to use a compiler without having to change a single piece of code," said Terry Martin, director of information systems at Asyst Technologies, Inc., an environmental systems provider for semiconductor manufacturers in Milpitas, Calif.

Much faster

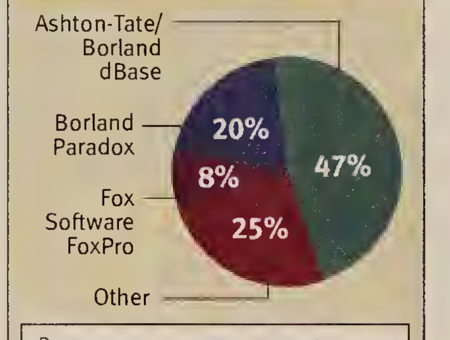
Version 2.0 of dBase IV for DOS is 10 times faster than the previous release, and its available memory has been expanded to 16M bytes. In addition, Borland has borrowed filtering technology from its InterBase relational database that dramatically speeds indexing and querying.

"There are about 660,000 lines of code in dBase IV, and we've touched about 200,000 lines of that in the new release," said Vince Mendillo, dBase IV product manager. The new release was designed to keep software developers who have been moving to dBase from Microsoft Corp. and Computer Associates International, Inc. in the Borland camp.

Installed dBase

dBase still commands nearly half of the PC database market

DOS 1992 DATABASE MARKET
PRELIMINARY ESTIMATE



PERCENT OF MARKET SHARE BY SHIPMENT
TOTAL MARKET: 2 MILLION UNITS

Source: International Data Corp.

"In tests we did, we found this release is essentially identical in performance to [Microsoft's] FoxPro for DOS," said Paul vonFange, a senior systems analyst at 3M Co. in St. Paul, Minn.

"We're still anxiously awaiting the Windows version of dBase IV, but they've done a very nice job with this version of the DOS product," said Bob Davies, president of SBT Accounting Systems, Inc. in Sausalito, Calif.

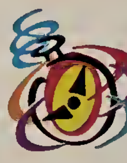
Davies said SBT sells a mid-range accounting system that uses dBase IV on DOS and Unix platforms. It also has a high-end version of the accounting package that uses the richer facilities of Microsoft's FoxPro on DOS and Windows.

"Supporting both databases is driving us crazy," Davies said.

Davies said that once Borland delivers its Windows implementation, which will support the dBase language and the object-oriented environment that Borland provides in its Paradox relational database and Quattro Pro spreadsheet, SBT may reevaluate its course.

And even though Microsoft has a significant head start in the Windows market, Borland should be able to leverage its installed base if it delivers its Windows implementation this year, said Bill Kesselring, an industry analyst at Dataquest, Inc. in San Jose, Calif.

"It's taken a year and a half for Windows to build momentum, so I think the critical mass will still be there when Borland delivers later this year." Kesselring said.



Roughly 30% to 40% of the speed improvements in the new release are attributable to the increased available memory, while the rest of the performance enhancements are due to the filtering technology and streamlining of dBase code, said Vince Mendillo, dBase IV product manager.

Direct sales

Compaq's PCs coming in the mail

At a glance

IBM PC Co. and **Compaq** took steps to prove they are serious about playing the low-price game. Analysts said the moves did not signal another price war.

IBM cut prices up to 20% on its desktop systems, while **Compaq** cut its desktop pricing up to 22% and low-end notebook pricing by 9%.

Advanced Logic Research, Inc. in Irvine, Calif., also cut prices on selected models to ensure a 10% to 20% differential compared with equivalent Compaq systems.

By Michael Fitzgerald
HOUSTON

Compaq Computer Corp. will officially begin selling some PCs via direct mail next Monday, and it may be surprised by who calls.

Several information systems managers at major corporations expressed interest in Compaq's DirectPlus mail-order program, though it targets small and home-office users.

Going direct "gives them a big edge in our world because with our distributed business model, the direct channel has always worked better for us," said Bill Lodge, project leader at Turner Corp., an international construction company based in New York. Turner buys primarily from Dell Computer Corp.

"We would like to be able to buy systems [directly] from Compaq," said John Geyer, director of systems at Financial Guaranty Insurance Corp. in New York. Financial Guaranty buys from Compaq through dealers.

"Dealers seem to me an unnecessary step in the chain. I don't think we'll really benefit in price, but to get automatic feedback on delivery times is something I would like," Geyer said.

Under DirectPlus, Compaq will sell select models of its ProLinea, DeskPro/I and Contura PCs via a toll-free telephone number. The company expects to distribute more than 2 million catalogs starting this week.

Barbara Krumland, a nine-year Compaq veteran who is vice president of DirectPlus, said Compaq will initially offer only models that "are caught up in terms of demand." Compaq is said to be having difficulty meeting demand for some of its products.

Geyer and other users said they are interested in seeing Compaq expand its offerings before they begin purchasing machines directly from the company.

What's coming

Krumland said Compaq will add other models as it catches up with demand and will likely add the DeskPro/M line to its direct-mail offerings in the second quarter. On-site service will be handled through a contract with GE Service.

DirectPlus also includes 34 popular software titles, and Compaq has created three different hardware/software bundles. Krumland said Compaq may expand its software title selection but probably only slightly. She pointed to this as a significant distinction between Compaq and the five direct resellers it has worked with since last November; those companies handle more brands of PCs and software than Compaq.

Compaq expects 7% to 10% of its business to come from DirectPlus by year's end, according to Krumland.

Lotus fires back at Microsoft with support plan

By Michael Vizard
CAMBRIDGE, MASS.

The PC software industry's maneuvering to capture the loyalties of information systems directors moved forward last week as Lotus Development Corp. disclosed a series of programs designed to make it easier to maintain Lotus applications.

The Lotus initiative, which involves three support options that will be offered through Lotus resellers, was designed to help counter Microsoft's recently disclosed MS-Select program [CW, Feb. 1].

The first option was designed to supplement an existing help desk at a customer site. The second provides a dedicated support specialist from Lotus, while the third allows end users at a site to call Lotus personnel directly.

Both the Lotus and Microsoft programs are part of a trend in which software vendors offer support options to help offset the loss of profits incurred by the ongoing bruising price war, said Bob Johnson, associate director of PC software services at Dataquest, Inc. in Framingham, Mass.

The companies that provide higher levels of service are the ones that will survive, said Stuart Woodring, director of software strategy research at Forrester Research, Inc. in Cambridge.

"In the absence of any product differentiation in the traditional desktop application market, services, support and other business practices will drive the purchasing decision," Woodring said.

Ready to commit?

Lotus must also contend with programs from WordPerfect Corp. and Borland International, Inc. WordPerfect's program requires customers to have more than 500 PCs and commit to purchasing more than $10,000 worth of software. Borland requires a $200,000 commitment over two years to participate in its program.

Flexible discounts

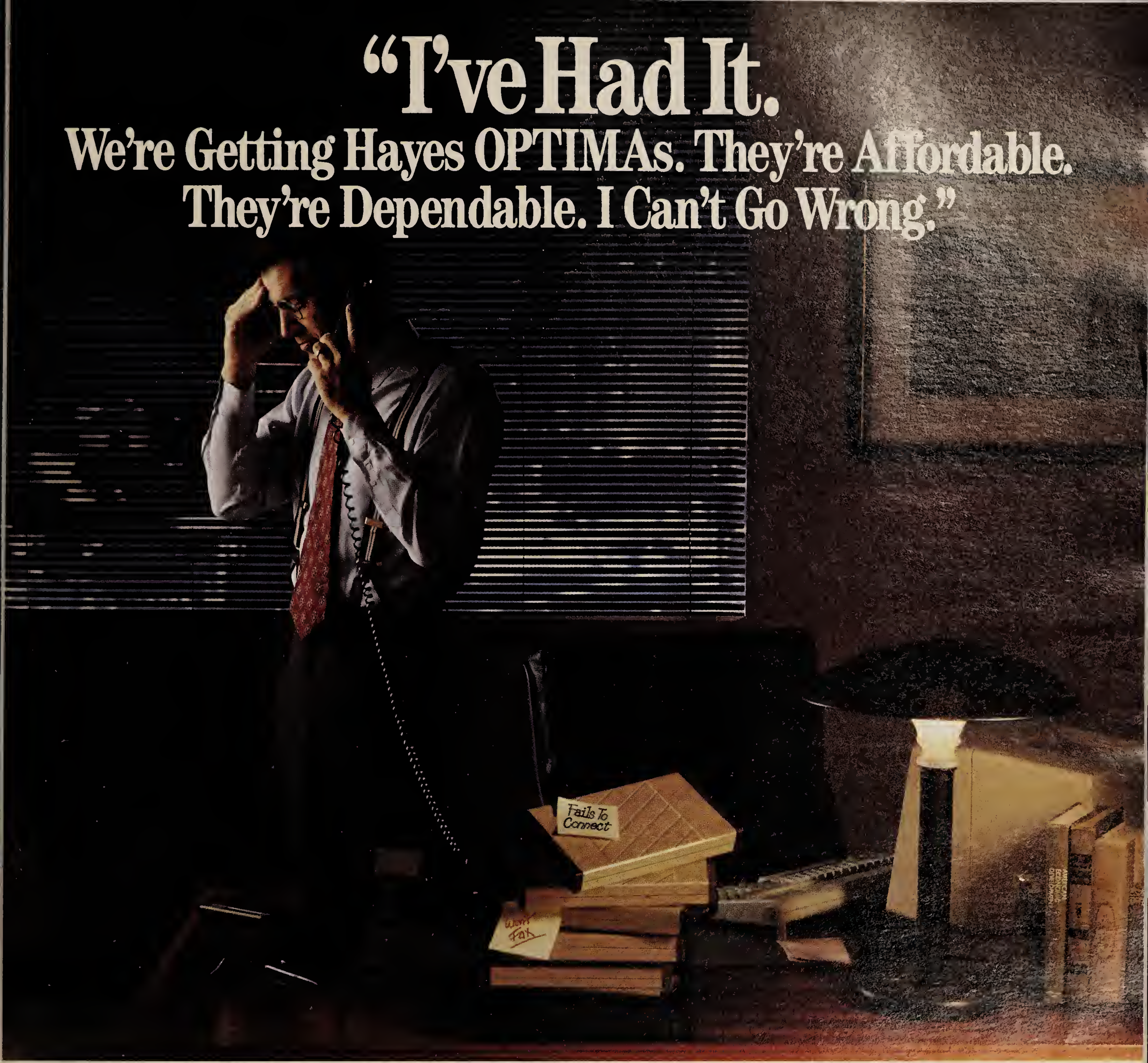
Unlike Microsoft, which offers a series of maintenance programs on top of tiered volume discounts, Lotus will negotiate discounts on an individual customer basis.

For example, Continental Bank in Chicago chose Lotus over Microsoft because Lotus was more aggressive and flexible, according to Andy Kerr, director of corporate technology.

"While the individual costs of software and suites are important, the nonproduct costs associated with acquiring the software, supporting it and maintaining it are critical. It's kind of a chicken and egg situation," Kerr said.

Lotus executives said their strategy was designed to be as flexible as possible when dealing with large IS accounts.

"It's not that easy to come up with a standard contract for large accounts because these types of accounts typically want to negotiate every aspect," said Sidney Turner, Lotus' cross-product marketing manager.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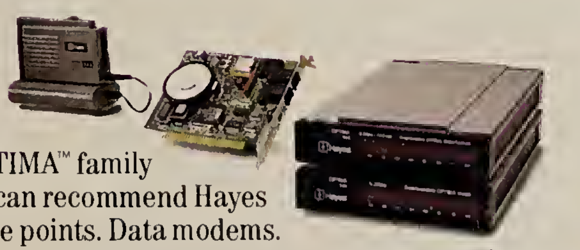

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News Shorts

1-2-3 for Windows 2.0 reaches test sites

Lotus Development Corp. last week began delivering beta-test copies of 1-2-3 for Windows 2.0. Scheduled to be released in the second quarter, Version 2.0 is a full-blown Windows implementation of 1-2-3 said to include version management and tracking utilities designed to make it easier to share spreadsheets, provide support for in-cell editing and allow on-sheet charting. Also included in the new release is client and server support for the Object Linking and Embedding protocol.

Carrier wars rage on

In the ongoing legal tumult among the long-distance telecommunications carriers, **MCI Communications Corp.** last week asked the **Federal Communications Commission** to halt AT&T's attempts to penalize its customers who seek to change carriers. MCI cited alleged AT&T tactics such as threatening to withdraw account support for Fresh Look candidates — those who might opt for a different carrier for 800 service once 800-number portability among carriers takes effect. Meanwhile, WilTel has filed suit with a federal court. The carrier seeks damages from AT&T resulting from an alleged AT&T mail campaign intending to woo WilTel customers by challenging the legality of their WilTel contracts.

Microsoft adds TrueType Mac fonts

In an escalation of the font wars between **Microsoft** and **Adobe Systems, Inc.**, Microsoft will deliver an add-on TrueType font package this week for the Apple Computer, Inc. Macintosh that will give the company a common set of 102 fonts for both Windows and the Macintosh. Windows and the Macintosh operating system come bundled with TrueType fonts, a situation that is putting pressure on Adobe's dominance of the font market. The add-on font package from Microsoft is priced at $99.95.

Borland trade secrets withheld from suit

Santa Cruz County Court officials in California last week gave **Borland International, Inc.** the temporary right to keep private certain product and marketing information allegedly stolen by **Symantec Corp.** executives Gordon Eubanks and Eugene Wang. Spencer Layton, Borland's vice president of business development, told the court that the information contained in Wang's MCI Mail messages to Eubanks has "independent economic value, [and] Borland's competitors could most certainly obtain economic value from a knowledge of these trade secrets."

London Exchange cancels project

The London Stock Exchange has suffered its second major computing disaster in six months with the cancellation of a $580 million project to build a paperless trade settlement system. The Taurus project, begun in 1989, would have cut the time needed to settle trades from three weeks to two or three days. The project was killed after Andersen Consulting advised the Exchange that the project would take another three years and a good deal more money to complete. Last September, the exchange withdrew a system that would have provided X.25 links to brokers and banks.

SHORT TAKES **NCR Corp.** cut prices 11% to 19% on its NCR 3170 notebook computers.... **Seer Technologies, Inc.**, a Cary, N.C., application developer formed by a venture led by IBM and The First Boston Corp., plans to take a stab at the general computer-aided software engineering market, branching out beyond tools for building financial applications.

News shorts, *page 16*

Citicorp reaps net benefits

Global consolidation helps bank save more than $60 million

By Thomas Hoffman
NEW YORK

One year after launching a global effort to consolidate more than 100 telecommunications networks, Citicorp has reduced costs by $60 million, some $10 million more than originally estimated, bank officials said last week.

The bank said its better than expected savings were achieved by the following measures:

- Signing MCI Communications Corp. as its primary U.S. long-distance telecom carrier, which is expected to save the bank $50 million over four years.
- Consolidating five worldwide telecom centers into one.
- Blending eight help desks into one.
- Standardizing on networking platforms and protocols.

The Citicorp Global Information Network (CGIN) initiative is a key component of Citicorp's cost-cutting endeavors, which include software and hardware asset management programs [CW, March 1]. CGIN is an effort by Citicorp to develop a single global backbone for all company networks based on the Open Systems Interconnect (OSI) standard so Citicorp's products and services can be accessed through any location on the network.

Citicorp executives said the consolidations have resulted in minimal staff reductions. CGIN currently has 1,100 network and telecommunications staff members worldwide.

Network advantage

The CGIN project is also meant to give Citicorp a competitive advantage as the $219.3 billion bank-holding company further expands its directory service to end users and customers. The directory service is a repository for all network objects, including topology, users, systems and resources.

Citicorp has worked with Bellcore for the past year to analyze how it can better use directory database access through a single application programming interface (API), according to Howard Brooks, Citicorp's senior telecom officer.

For example, Brooks said Citicorp's traders — 400 of whom are currently being transferred from one site in New York to another — will be able to access data from both legacy and distributed systems environments using a single API. That research is based on the X.500 protocol, with pilot goals determining the costs and complexities of linking directories to one another.

Analysts said that although Citicorp's cost-cutting endeavors are not unique, the firm's X.500 research appears to be leading-edge.

"That would be a step ahead of what most banks in the U.S. comparable to Citicorp's size have done," noted James Moore, president of Mentis Corp., an Eden, Md.-based market research firm that focuses on banking technology. Most banks rely on the X.25 protocol, said Moore, who added that X.500 represents a significant upgrade in technical capabilities such as speed and bandwidth.

During the past year, Citicorp has also standardized on such network protocols as OSI, X.400 and DECnet. In addition, Brooks said Citicorp signed a contract last year with Novell, Inc. to standardize on and install Novell local-area networks throughout Citicorp's enterprise systems in 93 countries.

Brooks said the deployment of CGIN is nearly complete, save for a handful of smaller countries that have not yet been fully linked, such as Russia. Those countries, according to Brooks, should be linked by the end of the second quarter.

Mary Kay colors All-In-1 with Notes make-over

By Michael Vizard
DALLAS

One of the world's leading cosmetics suppliers last week said it will revamp its office automation system with a splash of Lotus Development Corp.'s Notes groupware.

Mary Kay Cosmetics is integrating Notes into its monolithic Digital Equipment Corp. All-In-1 system to support task forces that are quickly formed and disbanded at the conclusion of a particular project.

"We have groups that form quickly for about a month or so and then disband. Notes allows us to support those kind of activities," said Bill Dewberry, director of office systems at Mary Kay.

Mary Kay intends to link its Notes environment, which is currently running on 350 PCs linked via DEC's Pathworks network software, to the VAX systems over an All-In-1 gateway for Notes that DEC will deliver next month.

However, Dewberry said that rather than rely on Lotus mail offerings for his network, he intends to run WordPerfect Corp.'s WordPerfect Office as his mail transport. "The Notes application is really intended to provide us with some supplemental capabilities we didn't have before. We don't intend to use Notes as a mail package," he said.

On the move

Among the first applications Dewberry deployed using Notes was an executive travel-tracking system. Executives are equipped with portable PCs that allow them to be updated on decisions made at any meeting they miss while away.

"With Notes, they can respond to the meeting the minute they dial in. The ability to synchronize databases on portable PCs across international boundaries was one of the big reasons we went with Notes," Dewberry said.

"To build this application, DEC quoted a proposal that would have cost $15,000 to $20,000. Using Notes, we built it in three days," he said.

More Notes

Currently, Mary Kay has Notes running on three OS/2 servers, with up to 170 users accessing those servers. Short-term plans call for installing another server and boosting the number of Notes users at the company to somewhere between 250 and 300, Dewberry said.

Working with Syntrex Technologies, a network integration subsidiary of Phoenix Technologies, Inc. in Valley Forge, Pa., that resells Notes, Dewberry said he expects to deploy 15 applications, including an inventory tracking system for capital equipment, a purchase order system and a help desk.

Dewberry was unable to say exactly how much Mary Kay will ultimately spend on its Notes project, but thus far, he said, the company has spent about $250,000.

CA cuts keys

CONTINUED FROM PAGE 1

dors — including SAS Institute, Inc., Legent Corp. and CA — to warn customers of upcoming license expiration dates and unauthorized software use, such as software moved to unlicensed CPUs. Fear of administrative foul-ups caused by either vendors or users has heightened user concern that mission-critical applications could be halted by means beyond their control [CW, Nov. 30, 1992].

Suggestions heard

The decision to remove the disablement feature came following suggestions from CA's chief information officer conferences, CA's Client Executive Advisory Council — a nine-member group that advises CA on client issues — and individual users, Kumar said. The move comes almost one year after CA began revamping its tiered-pricing structure at the request of large users [CW, April 20, 1992].

"The message is we're listening; we're responding," Kumar said. CA's removal of disabling code is expected to take 180 days, he added.

CA has not put any disabling code into its nonmainframe products. The company intends to address authorization issues for its Unix, PC and distributed applications customers at an undetermined date, Kumar added.

CA's Total Client Care (TCC) program, launched in November 1991, is an on-line problem detection service available through CompuServe. TCC may prosper with the demise of encrypted keys.

Kumar estimated that 2,000 to 3,000 CA customers have registered for TCC since its inception. That is about 15% of CA's installed base. "I'd be willing to bet that this percentage will go up. The disablement feature was a real impediment to joining TCC, even with the pricing options" offered under the program, said Fred Joy, a senior analyst at Meta Group, Inc. in Westport, Conn.

Alamo Rent-A-Car, Inc. in Fort Lauderdale, Fla., registered for TCC more than a year ago. Although the rental firm has not experienced any problems with the encrypted code, information systems executives there said they were still thrilled by CA's announcement.

"I think it's an outstanding step forward in rebuilding the customer trust relationship. We are incredibly finicky about properly licensing everything, and we appreciate being treated [by the vendor] with the same level of respect," said Tom Loane, Alamo's vice president of computers and communications.

Val Morgan, a database administrator at a large aerospace firm in the Pacific Northwest, had voiced concern over encrypted software in the past. Morgan said he was "ecstatic" about CA's plans. Though his organization has not yet signed up for TCC, he said, CA's reversal on requiring disabling code for TCC-controlled software "is certainly going to ease the path."

Other users said they were relieved to see the messaging system replace disabling code.

"That's how we would have hoped the [authorization] mechanism would have worked all along," said Douglas E. Underhill, assistant vice president of technical planning at CSX Technology, Inc. in Jacksonville, Fla. CSX also has yet to sign up for TCC.

Underhill and other users predicted that CA competitors that have not formally withdrawn disabling code from their software will most likely be forced to do so. "Given CA's size, it would be a trend that's difficult to buck for smaller [independent software vendors]," Underhill said.

Vienna, Va.-based Legent announced plans last month to replace its existing encryption method with an as-yet-undetermined process.

SAS Institute has no plans to replace its encrypted keys.

Correction

A story on page 102 contains an error caught after the page went to press. Only one-fourth of the 100 firms polled are attempting full-scale re-engineering. Of those engaged in re-engineering, the number tackling full-time projects is one in three.

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DCE migration made easier by development plan

By Elisabeth Horwitt
WASHINGTON, D.C.

A development environment introduced last week promises to take much of the pain and long-term grunt work out of moving corporate systems to the Open Software Foundation's Distributed Computing Environment (DCE).

Hewlett-Packard Co. and Ellery Systems, Inc., a Boulder, Colo., application development tool vendor, announced Ellery Open Systems for DCE at the Interop '93 Spring show. The product is said to eliminate the need to completely rewrite existing applications to make use of DCE's distributed environment.

The vendors claimed it will also buffer the nontechnical programmer from DCE programming complexities such as Motif and remote procedure calls. And it will cut typical DCE system development time from approximately a year to weeks, Ellery claimed.

In addition, legacy applications reportedly can go on accessing the data in a traditional, non-object-oriented way, facilitating gradual migration to DCE.

The product puts Ellery's application development environment on top of HP 9000 Series 800 business servers running DCE. The product will support major platforms from companies such as IBM and Digital Equipment Corp. when they fully support DCE, Ellery Executive Vice President Geoffrey Shaw said.

Green application

In order to prove the platform's — and DCE's — viability and usefulness, HP and Ellery worked with several universities to develop a distributed, DCE-based application. The application, called Earth Data Systems, is said to enable earth scientists throughout the country to pool resources and share data in real time. This allows the scientists to work on problems such as deforestation modeling, ozone depletion and climate change.

Project planners said they hope to have a "collaborative data browser" up and running by November that will use DCE's remote procedure call to let scientists browse across "data collected by different satellites, in different formats, residing on different types of systems," said Mark Abbott, associate professor at the College of Oceanography at Oregon State University.

Long term, Earth Data Systems will be extended to "any earth science in the academic and government worlds, and then to businesses like forestry and logging," Abbott added.

User workstations will connect over the National Science Foundation's NSFnet, which supports backbone speeds of 45M bit/sec. The system will run initially on HP 9000 Model 800s.

The DCE platform also enables scientists to collaborate with voice, data and video, "instead of [one user] sending [another] the results and him replying, 'That's not quite right,' " Abbott said.

HP and Ellery plan to use the Earth Data Systems project as training for working with users and dealing with human, administrative and management issues that crop up in a real distributed computing environment, Murphy said.

The system, now in prototype, will eventually connect scientists at NASA Astrophysics, the Earth Ocean Space Institute at the University of New Hampshire and several other universities around the country.

"[Earth Data Systems] does make it easier to develop DCE-based environments or applications," said Pat Aucoin, computer systems specialist at Lockheed Corp. The Houston-based company is working with NASA on a knowledge-support system that will use Earth Data Systems on top of DCE, he added. The idea is to connect the user transparently to whatever information is needed for a given project, no matter where, on what system or in what agency it resides around the world, Aucoin said.

Ellery Open Systems for DCE is priced at $9,900 for the development kit, with client licenses at $395 per seat. Quantity discounts are available, Ellery said.

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ASK to build open tools kit

By Jean S. Bozman

SANTA CLARA, CALIF.

The ASK Group, Inc. last week told users that it plans to build "open" development tools that work with database engines from many vendors.

At the same time, ASK said it would ship by this summer a version of its Manman/X suite of manufacturing and financial applications that will work with the Oracle Corp. relational database and is developing a version for Informix. ASK's move was inevitable, given the strength of the worldwide open systems market, said Pier Carlo Falotti, chief executive officer. ASK derived most of its $432 million in revenue last year from sales of its Unix-compatible Ingres Products Division database.

The initiative is also necessary because most of Ingres' key features have been matched by Oracle, Sybase, Inc. and Informix Software, Inc., analysts said. Users at the ASKUS International, Inc. conference said they are interested in ASK's open systems strategy. But many who have used minicomputers for years said they had no immediate plans to move to Unix, to open systems or to new databases.

"I've been a wait-and-see person for many years, and I'm still waiting to see," said Alan J. Ginsburg, corporate information systems manager at Atari Corp. in Sunnyvale, Calif. Atari runs its worldwide Manman manufacturing applications on centralized Digital Equipment Corp. VAXs, Ginsburg said. "Open systems hasn't yet become a reality," he said. "It's a wonderful concept, but I want to use mature technology."

Gang of four

ASK is forming a new tools division with its own engineering, product development and marketing staffs, headed up by Eric Carlson, president of ASK's Applications Division. It will be one of four product divisions. The other three are the Ingres Database Division, the ASK Computer Systems Applications Division and the Data 3 Applications for IBM AS/400 Systems. Management and administrative functions will be shared by the four product groups.

Others want to learn about the "open" tools and new Manman/X versions to support a variety of systems in remote business units. "We are resistant to making an early jump to a Unix platform," said Jim Crear, IS director at Instrumental Laboratory, Inc., a Lexington, Mass., medical-equipment maker that runs Manman manufacturing software on Hewlett-Packard Co. MPE/IX systems. Before moving to Unix, Crear said, he wants to see more Unix management tools on the market and more Manman functions to migrate to the Manman/X suite.

Eric Carlson, president of ASK's Applications Division, said ASK's open systems strategy was designed to match the reality that several brands of relational databases are being used within most major corporations. It may also spur applications competitors such as SAP America, Inc. to consider using the Ingres relational database as one of the engines that drive their packaged software, Carlson said.

CASE

Partners hop on to SoftBench

By Kim S. Nash

SAN FRANCISCO

Hewlett-Packard Co. last week said 15 computer-aided software engineering (CASE) vendors — including market leaders KnowledgeWare, Inc. and Texas Instruments, Inc. — will target commercial Unix users by porting their tools to HP's SoftBench framework.

The plan, announced at the CASEWorld conference, could become a "workable" open systems version of IBM's ill-fated AD/Cycle and is well-timed to capture client/server downsizing business, observers said.

SoftBench, introduced in 1989, provides messaging standards that let applications development products from different vendors talk to one another. Until now, mainly technical Unix vendors supported the framework, which has sold 20,000 licenses to date.

Bringing business-oriented development tools into the fold will make SoftBench more appealing to corporate users interested in moving to Unix-based client/server systems, said Peggy Ledvina, program director for application development strategies at Meta Group, Inc., a consultancy in Westport, Conn.

Because the SoftBench framework makes tools from different vendors more compatible, reconciling new development with maintenance of existing applications is easier, said Dale Lamston, a consultant at Richard Irwin and Associates Ltd. Often, tools to manage or enhance legacy mainframe systems are different from those used to build more modern programs, such as Unix applications, explained Lamston, who helps Fortune 500 companies plan development projects.

SoftBench helps hide the differences between products, he said.

Along with KnowledgeWare and TI, other SoftBench Channel Partners include CGI Systems, Inc. in Pearl River, N.Y., Intersolv, Inc. in Rockville, Md., Legent Corp. in Vienna, Va., and Netron, Inc. in Downsview, Ontario.

HP also announced that Micro Focus, Inc. in Palo Alto, Calif., will build a version of Micro Focus Cobol for SoftBench to help downsizers bridge the gap between mainframe-based programs and under-construction Unix systems.

About 60% of 1992 SoftBench sales were to technical Unix users. Total sales are up 50% so far this year, compared with the same period in 1992, mainly because of the debut of SoftBench 3.0 last June, HP said.

But the timetables vary for when these products will see the light of day because not all of the vendors currently have Unix products. For example, KnowledgeWare has stated its intention to ship a Unix code generator this year, while Intersolv is ready to go with a Unix edition of its version control utility.

SoftBench's commercial facelift looks a lot like AD/Cycle without the infamous repository shadow, said David Sharon, president of CASE Associates, Inc., a market research firm in Oregon City, Ore.

Perhaps the biggest indicator that AD/Cycle is dead is IBM's strengthened commitment to SoftBench; IBM expanded its license from AIX to encompass OS/2 systems as well, Sharon noted.

HP has sidestepped the repository issue altogether by being "committed to a multiple repository strategy," according to Tom Christian, research and development manager for SoftBench. Translation: Users must rely on SoftBench supporters to provide a repository.

Oracle GUIs

CONTINUED FROM PAGE 1

across many client/server platforms. The result is an upgrade to GUI screens and to client/server functionality that leverages the Oracle 7 distributed relational database that first shipped to users in January.

The tool set will allow information systems shops to continue to develop terminal-displayed applications for some business units and to give interactive database access to business units that have Microsoft Corp. Windows-based PCs, Unix workstations and Apple Computer, Inc. Macintoshes.

Some users said the tool set is overdue, but they remain enthusiastic about using it.

"SQLForms 4.0 has been in the works for several years, but I'm certainly excited about it," said Tom Patterson, a software analyst at Quintiles, Inc. in Research Triangle Park, N.C. "If it's good and solid code, Oracle's in good shape."

However, Patterson said, it is important that the tool set work with other vendors' databases — a move observers said they expect the company to make. "Oracle cannot make the mistake of being a proprietary tools vendor," he said.

Michael Fisher, a database administrator at the Fuller Co. in Bethlehem, Pa., said his firm has already begun client/server application development with SQLForms 3.0, Oracle CASE Dictionary 5.0 and the Oracle Version 6.0 database. "We're not waiting for SQLForms 4.0 or Oracle 7," Fisher said. "But we will upgrade to them in time."

Shipping in order

The first wave of CDE products will support Microsoft's Windows environment, followed by versions for the Open Software Foundation's OSF/Motif, Sun Microsystems, Inc.'s Open Look, IBM's OS/2 Presentation Manager and Apple's Macintosh. Windows-compatible versions of the CASE tools will ship by year's end, said Farzad Dibachi, Oracle's senior director of product marketing for CDE.

Support for Windows will precede that for all other GUIs, Dibachi said, because of the success of small tools vendors such as Powersoft Corp. and Gupta Corp. in selling Windows client/server software to many large Oracle users.

All the CDE tools generate Oracle's PL/SQL code, which makes the code portable across many platforms, Dibachi noted.

Oracle's CDE is a set of integrated tools built on software layers that support many types of front-end client machines.

"With one set of source code, they're trying to eliminate the systems integration that has been a real bottleneck for IS to absorb," explained Peter Kastner, vice president at Aberdeen Group in Boston.

The CDE tool set will be used with the Oracle Glue application programming interface and Microsoft's Open Database Connectivity interface to speed the transition of Oracle character-terminal applications to client/server applications, Kastner said.

Managing all of CDE's 14 modules may be difficult for some user sites, and some users said they wonder whether Oracle will offer the CDE tools bundled in one package.

Analysts said some users may have trouble selecting which tools to buy: "You buy each tool individually, so there's a lot of picking and choosing," noted Laurence Fong, an analyst at Alex. Brown & Sons, Inc. in New York. "Part of Oracle's challenge will be simplifying it for the users."

Applications built with CDE tools can connect with several brands of target databases by addressing Oracle servers outfitted with database gateways.

However, truly open applications that can work against non-Oracle relational databases without requiring users to write any database-specific interface code will probably not be available immediately, analysts said.

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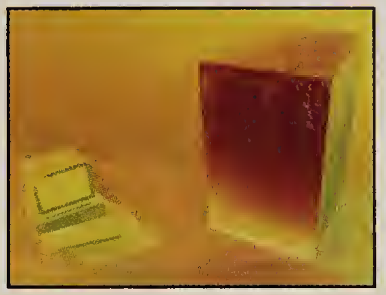
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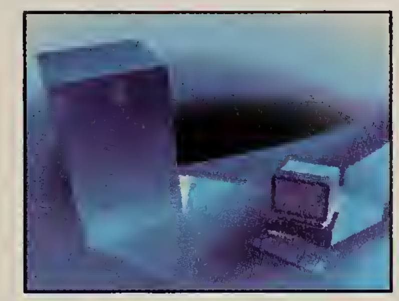
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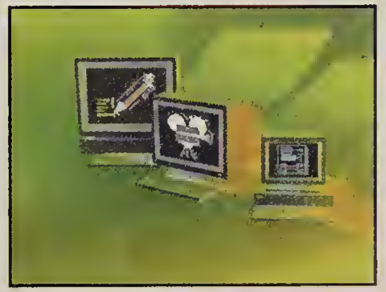
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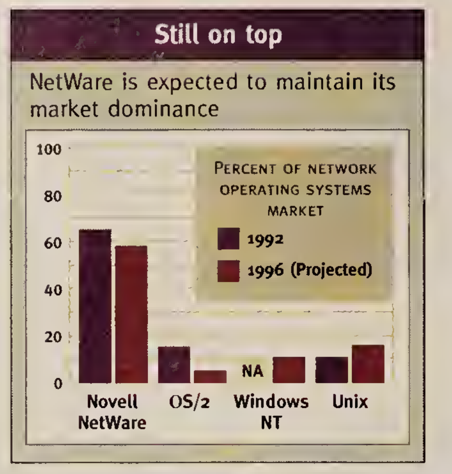
NetWare 4.0's ease of use lauded

By Michele Dostert
WASHINGTON, D.C.

Network administrators just want to go home on time, according to Ameet Patel, emerging technology analyst at BASF Corp. in Parsippany, N.J. And therein lies much of the appeal behind Novell, Inc.'s NetWare 4.0, agreed a panel of users at last week's formal unveiling of the much-awaited network operating system.

Ease of installation and management topped the list of reasons behind sometimes rapturous commentary from a cast of beta-test users assembled at the show by Novell.


Still on top

NetWare is expected to maintain its market dominance

Source: International Data Corp.

"My administrators were awestruck because the tools worked," Patel said. "An administrator's nightmare is trying to set up WordPerfect on 200 servers with 3.11," he said, adding that Version 4.0's graphical user interface (GUI) utility "simpifies life" by dealing with the real pain of managing global networks.

"The GUI utility is a dream come true," agreed Stanley Jaroski, vice president of business systems review at Citibank NA, which has between 700 and 2,000 NetWare local-area networks in 90 cities running many versions of NetWare.

Despite their enthusiasm, these and other NetWare users contacted last week made it clear that they will proceed slowly and carefully with a 4.0 migration. "Technology revolution occurs through evolution," noted Patel, who has equipped his field personnel with a homegrown guide to 4.0 migration. "You really need to plan out your [4.0] environment," he stressed.

Novell is aware of these concerns. Introduced in 1989, NetWare v3.11 had been adopted three years later by only 35% of Novell installations, according to The Burton Group, a network research firm in Salt Lake City.

"That's why we've worked so hard to create a simple, clean upgrade path to NetWare 4.0," said Bob Young, Novell's product marketing manager for NetWare.

For example, installing previous versions of NetWare required first off-loading all server data, then loading dozens of floppy disks, then reloading data and entering user information. NetWare 4.0, by contrast, can be installed on top of existing NetWare 3.X or 2.X servers without off-loading or reloading anything. From the CD-ROM version, the installation reportedly takes about 20 minutes.

A key component of this upgrade is a set of migration utilities that automatically convert the server-centric, bindery-based user information on NetWare v3.11 servers to the logically constructed global directory structure used in 4.0. When NetWare 4.0 is installed on a NetWare v3.11 server, all the user information is thus retained.

"All your users will be there, though you will still have to define other objects, such as printers and servers," said John Shorthall, network architect at beta-test site Air Canada in Montreal. "The graphical management utilities in NetWare 4.0 make it easy to then drag and drop your users into logical groups."

Further, a bindery-to-directory translation utility means NetWare v3.11 and NetWare 4.0 servers can coexist transparently in the same network. "You don't have to do an all-or-nothing upgrade, which would be a major disaster," said Dave Eckert, a member of Westinghouse Corp.'s Advanced Technology and Architecture Planning Group.

He recommended setting up users and objects on the first 4.0 server, then copying the data to others. He suggested that the server data be off-loaded and reloaded to take advantage of NetWare 4.0's disk management and data compression features.

Novell has also taken pains with the NetWare 4.0 client software. Unlike NetWare 2.X and 3.X client software packages, the new NetWare 4.0 client, called the NetWare Client for DOS and Microsoft Corp.'s Windows, is "universal." It can access any NetWare 2.X, 3.X or 4.0 server.

The NetWare Client has been enhanced to include automatic network reconnection and a new GUI that simplifies previously arcane tasks such as mapping to distant servers. Tighter Windows integration allows users to access the LAN from anywhere in Windows by clicking on an icon.

Assistant news editor Patricia Keefe contributed to this story.

Net gains

NetWare-related nuggets picked up at Interop included the following:

Future of 3.X: Novell is "committed to the 3.X line" and will ensure backward compatibility and integration between the 3.X and 4.0 environments.

Cross-platform APIs: Later this year, Novell will add Unix, Microsoft Corp. Windows NT and Apple Computer, Inc. Macintosh support to its cross-platform APIs, which enable developers to write multiplatform applications just once.

Bridging directories: Novell has talked to Banyan Systems, Inc. about bridging their respective directory services and is looking at an X.500 vehicle.

Free help: NetWare Loadable Module certification is free from Novell for the next 90 days. Also free is a planning guide to configuring 4.0 LANs.

NetWare NFS Gateway: Maps the Unix Network File System (NFS) to the NetWare file system structure, letting NetWare users access applications, files and printers stored on Unix hosts. It will be available April 5.

Dataclub: Slated to ship this month, Dataclub will let networked Macintosh users see their connected peer-to-peer machines as a single virtual server, thus simplifying file management.

OS/2 and Windows NT support: The OS/2 requester allows network links from within DOS, Windows or OS/2. NetWare requester for NT will ship when NT does.

User concerns

Router interoperability still in its early stages

By Joanie M. Wexler
WASHINGTON, D.C.

While router vendors such as IBM are clamoring at the door of the ripe low-end internetworking market, interoperability concerns are inhibiting users from opening up to multiple vendors.

IBM last week joined the slew of suppliers vying for business in remote offices by introducing an inexpensive, low-maintenance version of its 6611 Network Processor router. But attendees at Interop '93 Spring said they are still wary of blending different vendors' routers in their networks — an attitude that could cramp the style of vendors such as IBM that are trying to woo branch-office business from established router accounts.

Users said they doubt a slight cost or functional advantage gained by introducing a new vendor into their router networks would be worth the added interoperability and management headaches.

"I wouldn't mix and match vendors; I want more homogeneous interoperability and consistency in downloading new software versions networkwide, and I don't want to deal with multiple vendors," said Chuck Warlick, network engineering specialist at Boeing Computer Services in Huntsville, Ala., a 125-router Cisco Systems, Inc. shop.

The router industry has not achieved true interoperability yet, analysts said, despite vendor efforts to standardize implementations of interrouter communications protocols, such as Open Shortest Path First (OSPF). OSPF lets routers exchange network configuration data in Transmission Control Protocol/Internet Protocol (TCP/IP) networks.

"Right now, OSPF is the only common thread" among the different router products, "and there are scalability problems with that," said James S. Tretter, telecommunications manager at Multifoods, a Wellfleet Communications, Inc. shop in Minneapolis. "Plus, different companies' routers use different configuration management" schemes, he added.

Warlick said he prefers Cisco's Interior Gateway Routing Protocol "because OSPF carries a lot of overhead and could chew up our processing power."

The rollout of IBM's $6,995 low-end 6611 Model 120, due to ship in May, follows an avalanche of router introductions in the past year to accommodate companies looking to affordably bring satellite offices with limited technical staff onto the corporate internetwork.

While the products appeal to the vendors' existing customers, users who fancy another supplier's low-end product fear the "shaky interoperability status" among equipment, Tretter said.

Tretter said he is intrigued by 3Com Corp.'s recently announced Boundary Routing architecture, a scheme that shifts much of the technical complexity from low-end devices into central routers to simplify network management.

However, "I don't trust the interoperability among the vendors," he said. "If I were to do it again, I'd consider 3Com as my backbone router vendor so I could get Boundary Routing."

At the show, a 14-router demonstration backbone mixed only Proteon, Inc. and Wellfleet routers, which cooperated on "those elements that have been standardized: OSPF, [Routing Internet Protocol] and TCP/IP," said George Pornaran, Interop's chief network engineer.

INTEROP 93
SPRING

Slow start

IBM, which shipped its first multiprotocol router in September, said it has about 60 installed and that development of the Model 120 "has already helped IBM win some business this year," said Jon Fjeld, director of routing systems products. IBM's late start means its installed base compares with about 65,000 for Cisco and 10,000 for Wellfleet.

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SNA battle

CONTINUED FROM PAGE 1

Communications, Inc. shop in Minneapolis.

"It's clear that big SNA customers are going to APPN, but it's too early for my clients to know about APPI. There hasn't been enough technical information available," said Harold Hauck, a consultant at Open Systems Computer Consulting in Corte Madera, Calif.

Large IBM shops will almost automatically go to APPN, "whether we know it or not, just by migrating to VTAM V.2 R4.1," which has APPN support, said Blaine Bauer, a data communications manager at Mobil Corp.

Users faulted both IBM and Cisco for battling rather than harnessing their resources to service customer needs.

Indeed, a number of SNA shops see a major advantage to migrating their hosts, and other traditional SNA devices, to APPN.

Hudsons Bay Co. is looking at APPN "not as a way to save network manager head count, but because it is more foolproof and flexible," than traditional SNA, said Janusz Szaban, a manager at the retailer. With APPN's automatic directory and routing functions, "users can just plug in their own workstations," he added.

Jeremy Duke, an industry analyst at Dataquest, Inc. in San Jose, Calif., agreed: "APPN is solid, and APPI still has a way to go. If you're an IBM shop, you're probably not going to go to something new like APPI."

The APPN/Advanced Program-to-Program Communications showcase was the first demonstration of distributed networking over multivendor, commercial APPN products. "This proves that APPN is out there and working and that other vendors are participating," Szaban said.

The APPI demonstration over Cisco routers and Cabletron Systems, Inc. hubs involved a prototype specification that lacked key promised APPI features, notably support for APPN End Nodes. End Nodes are able to automatically register their resources on an APPN directory so that APPN Network Nodes, or servers, can automatically route End Node queries to the right resource.

In addition, the prototype specifications were "entirely Cisco's" and therefore proprietary, Hauck said. While Cisco has officially turned control of APPI development to the APPI Forum, the 26-vendor body is not expected to come out with its "open" version of APPI until next year.

Cisco plans to release its first APPI-based products early next year, under the assumption that the forum will not significantly alter its original specifications, according to a Cisco spokesman.

But users faulted both IBM and Cisco for battling rather than jointly harnessing their resources to service their customers' internetworking needs. "We think vendors [such as IBM and Cisco] would be a lot more helpful if they were cooperating" instead of coming up with rival standards, said Barry Oscogne, a data communications manager at Bell Canada.

A big Cisco customer, the telecommunications company is currently struggling with "the experience of moving from an SNA to a multiprotocol backbone," Oscogne said.

"Both vendors, by not cooperating, are eventually adding more complexity to their boxes," Tretter agreed.

IBM claims two products that make APPI redundant: Data Link Switching, which routes APPN packets within TCP/IP, and a utility announced last fall that lets APPN ride on top of TCP/IP. Cisco said APPI lets users have APPN-like routing and directory functions on a TCP/IP backbone.

Boeing taps IBM to simplify routing

By Elisabeth Horwitt

Boeing Computer Services might well have been an ideal customer for Cisco Systems, Inc.'s Advanced Peer-to-Peer Internetworking if APPI had been commercially available 14 months ago.

Instead, The Boeing Co.'s information systems subsidiary became a test site for IBM's MultiProtocol Transport Network (MPTN) products announced last week, which are said to enable Systems Network Architecture (SNA)-based applications to communicate over a Transmission Control Protocol/Internet Protocol (TCP/IP) backbone.

Boeing's MPTN project is part of a multiyear effort to limit the number of transport protocols that run over the company's 300-plus Cisco routers, according to Jim Van Every, Boeing's manager of server interconnect. The company originally hoped to migrate from 17 different protocols to Open Systems Interconnect (OSI); however, those plans are on hold because OSI is still not commercially viable, Van Every said.

Driving Boeing's protocol-curbing efforts is the need to save on the costs of administering multiple protocols on the backbone, Van Every said. "It's a perennial problem for us: managing routers, routing tables and addresses, given that 70% of Boeing people move each year."

While leading router companies such as IBM and Cisco offer products to encapsulate SNA traffic into TCP/IP packets, network administrators still have to track user addresses for both types of protocols, Van Every said. In contrast, MPTN enables one set of TCP/IP backbone addresses to keep track of both TCP and SNA users, he added.

Boeing is now pushing for MPTN support from some of its major computer vendors. "If all computer vendors support this, all that router vendors would have to support is TCP/IP," Van Every noted.

APPN peer plans

Following are Advanced Peer-to-Peer Networking (APPN) products to come:

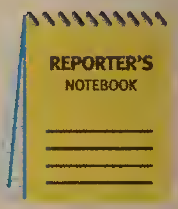
- **IBM** VTAM Version 3, Release 4.2, expected in June, enables IBM hosts to communicate as APPN Network Nodes.

  The product will also support IBM's MPTN protocol, which is said to enable Advanced Program-to-Program Communications applications to run over TCP/IP and TCP/IP sockets applications to run over LU6.2, IBM said. An OS/2 MPTN server is in the works. MPTN has the potential to run TCP/IP applications over APPN backbones. Application System/400 MPTN software is coming in two years, IBM said.
- **3Com Corp.** demonstrated Network Node on its bridge router, with shipment scheduled for late this year, a 3Com spokesman said.
- **Digital Communications Associates, Inc.** demonstrated a Token Ring gateway that allows PCs to access APPN resources via IBM's Low-Entry Network (LEN) protocol. The company plans to provide Network Node in a future release, a spokesman said.
- **Insession, Inc.** in Boulder, Colo., demonstrated an APPN End Node implementation on a Tandem Computers, Inc. host; shipment date is slated for next month.
- **Sync Research, Inc.** is developing a server that will enable PCs running LEN to access full APPN End Node capabilities without having to crowd their memories with the full End Node stack.
- **Network Systems Corp.** announced that its routers will support APPN Network Node by the end of next year. The routers will be able to encapsulate "non-routable protocols," such as NetBIOS, to go over APPN and TCP/IP backbones by 1995, Network Systems said. —*Elisabeth Horwitt*

Reporter's Notebook

Conflicting router vendor philosophies surrounding how best to transport IBM protocols through corporate internetworks have the industry confused. For example, **Wellfleet** announced plans to support IBM's Data Link Switching scheme in the third quarter. But **Cisco** and **Advanced Computer Communications** have no plans to support what they consider an interim step to IBM peer-to-peer networking.

Eleven vendors that lined up behind the **Hewlett-Packard/AT&T** proposal for 100M bit/sec. Ethernet committed to build hubs, routers, adapters and other devices and software based on HP's 100Base-VG scheme. Supporters include **Banyan**, **Microsoft**, Novell, **Proteon**, **Ungermann-Bass** and **Wellfleet**.



Lining up behind **Microsoft**'s ever pending Windows NT, **Beame & Whiteside Software** demonstrated its TCP/IP development services for Windows NT, giving Unix developers cause to switch.

The Internet Engineering Task Force says it is about two months away from releasing SNMP Version 2 as a proposed standard. **Epilogue Technology** promises to have SNMP2 available for its OEMs by next month.

HP, The Wollongong Group and Datability, Inc. jointly announced an enhancement said to enable the TCP/IP Telnet protocol to handle heavy-duty OLTP. Telnet/OLTP is said to decrease by up to 50% the host overhead associated with processing Telnet terminal-to-host sessions and to cut Telnet network traffic by up to 90%. HP will support the protocol on its HP 9000 Series 800 business servers. Wollongong will implement it on DEC systems.

Meanwhile, DEC introduced its FDDI-to-the-desktop GigaSwitch, which allows 34 simultaneous 100M bit/sec. data conversations between high-performance computers or VAXclusters. DEC said it will soon outfit the GigaSwitch with an ATM card that accepts FDDI traffic and converts it to ATM and vice versa. A DEC ATM product family will be available around the middle of 1994, officials said.

All documentation for developers wishing to write their own code for IBM APPN Network Node software will be available this month "for the cost of the printing only — about $300," said Jon Fjeld, IBM's director of routing systems products, at a press briefing. Licensing the code still carries a $400,000 price tag.

Users receive ATM reality check

By Lynda Radosevich
WASHINGTON, D.C.

Despite heavy Asynchronous Transfer Mode (ATM) price cutting and a round of new product announcements, users at Interop '93 Spring last week showed limited enthusiasm for ATM as a high-speed local-area network solution for the short term. However, many were still excited about ATM's long-term prospects.

Kenneth Miller, a telecommunications specialist at the U.S. Army Corps of Engineers in Portland, Ore., attended the show to investigate ATM because "we want to pile everything on our network, including video, data and possibly voice," he said. But after attending a session on ATM in the network, he said he decided that "ATM is not really a sovereign standard yet . . . and FDDI [with its published International Standards Organization standards] is."

> **Sending files using ATM technology is like putting paper through a shredder, sending each piece separately and gluing them back together at the end.**

Ultimately, ATM could be the LAN technology to combine many different media on one network, Miller added.

Vendor support

The tempering was helped in part by testimony from ATM vendors.

"ATM is essentially an engineering trade-off," said Larry Lang, product manager of ATM product development at Cisco Systems, Inc. in Menlo Park, Calif. "ATM is in a sense a design compromise that is good for carrying data, but it's not the best."

For Larry Smith, manager of operational development at Southern California Edison Co. in Rosemead, Calif., that compromise is too much to ask.

Smith was looking for a stronger network backbone to support pockets of videoconferencing. However, after attending the SynOptics Communications, Inc. ATM switch rollout, he said he was concerned that ATM was optimized for voice traffic and would have to be more mature before he would use it for data-intensive backbone traffic.

Making house calls

John Turner, a professor of computer science at Washington University in St. Louis, said he plans to deliver ATM bandwidth to the desktop to enable electronic distribution of medical images.

The school has put together a prototype network to transmit medical images and uncompressed video at 100M bit/sec. The network uses an Ethernet gateway that allows Ethernet frames to be sent over a multicast ATM virtual circuit and received at other ATM segments at different sites.

"ATM switching is certainly feasible — we built the stuff with graduate students," Turner said at the session.

However, while the early commercial ATM switching products from vendors such as Fore Systems, Inc. in Pittsburgh and SynOptics in Santa Clara, Calif., are well-suited for early deployment, Turner said he would like to see 128 to 256 ports rather than the 60-port hubs currently offered. More ports would help support "several thousand machines" on his network while minimizing the number of components and the complexity level of each network, he said.

For Mark Sanders, who oversees the internetwork architecture at Merrill Lynch & Co. in New York, the issue with deploying an ATM network is timing. Merrill Lynch's approach is to "wait for a standard to emerge to ensure that you are not buying proprietary solutions but buying a solution that will carry you into the next decade," he said.

In the meantime, in an attempt to enable Merrill Lynch to compete with the other brokerage firms by getting financial information to trader desktops faster, Sanders said he plans soon to begin testing Fore Systems' ForeRunner ASX-100 switch.

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News Shorts

DG to announce Unix tape array

Data General Corp. this week will announce a high-performance, fail-safe tape array for Unix that can back up a gigabyte database overnight without operator attendance. Initially available on DG's Aviion workstation line, the redundant arrays of inexpensive disks product offers five drives and will support Sun Microsystems, Inc. and IBM RISC System/6000 workstations within 90 days, company officials said.

USL dealt setback in Unix suit

Unix System Laboratories, Inc.'s (USL) attempt to halt distribution of the BSD/386 Unix operating system variant from **Berkeley Software Design, Inc.** was stymied last week by a U.S. District Court in New Jersey. The court denied USL's request for an injunction to stop distribution of BSD/386, based on a finding that USL was unlikely to succeed in its lawsuit alleging that BSD, based in Falls Church, Va., had infringed on copyrights and trade secrets from USL.

Concurrent wins security validation

Concurrent Computer Corp. in Oceanport, N.J., last week announced what it claims is the industry's first trusted real-time operating system. Concurrent's Trusted OS/32 and OS/32 MTM successfully completed the National Computer Security Center's evaluation and were awarded the U.S. Department of Defense's C2 level of trust.

Boeing shifts to HP hardware

The Boeing Co.'s Commercial Airplane Group said it signed an agreement with **Hewlett-Packard Co.** for Unix minicomputers and workstations to be delivered during the next two years. HP is believed to have bested **IBM** and **Sun** in a yearlong client/server bake-off at the troubled aerospace giant. The contract includes an optional yearlong extension and makes HP Boeing's "majority supplier" of Unix hardware, HP said.

NLM version of InterBase demonstrated

Borland International, Inc. showed a working version of its InterBase 4.0 relational database running as a **Novell, Inc.** NetWare Loadable Module (NLM) at the Interop '93 Spring show in Washington, D.C., last week but gave no pricing or availability details. A **Microsoft Corp.** Windows NT version is also planned. Borland's original plans called for InterBase 4.0 to be adapted first as an NLM, but Borland said last week that it may use the current InterBase 3.3 for the first NLM version.

SHORT TAKES Object-oriented development tools maker **Intellicorp, Inc.** is expected to announce Kappa CommManager, a series of products designed to enable cooperative processing between object-oriented and traditional applications. The first module will let users distribute programs among Unix workstations and PCs running Microsoft Windows.... **BT North America, Inc.** filed a petition with the Federal Communications Commission seeking permission to offer international virtual network services for intercountry transport of data, voice, video and fax, which would give corporate customers private networklike capabilities at a lower cost.... **Wang Laboratories, Inc.** signed an agreement with **HP** under which HP will market and sell Wang software — including imaging and computer-aided software engineering tools — on HP's 9000 Series 800 servers. Wang will also resell HP's platforms under the HP label.... Wireless messaging vendor **Embarc** last week announced a deal with **Pacific Bell Connection**. Pacific Bell Connection is the first local telephone company unit to offer a link to Embarc.

IBM, Apple, Motorola gain allies for RISC chip set

By Maryfran Johnson
BOSTON

The PowerOpen Association, Inc. opened for business last week, adding yet another industry group to the crowded landscape of open systems organizations.

PowerOpen is an alliance of IBM, Apple Computer, Inc., Motorola, Inc., Groupe Bull, Thomson-CSF, Harris Computer Corp. and Tadpole Technology, Inc.

Its goal is to promote the PowerOpen environment, which includes the PowerPC reduced instruction set computing (RISC) architecture and a new PowerPC Application Binary Interface (ABI).

The PowerPC microprocessors will be the follow-on generation to IBM's RISC System/6000 chip. IBM, Motorola and Apple have been developing PowerPC since 1991, and systems based on the new microprocessors will begin shipping late this year and into 1994.

The machines will reportedly run both IBM's AIX and Apple Macintosh applications unmodified. Combining the friendly Macintosh interface with the underlying power of Unix and RISC could put a dent in Intel Corp.'s dominance of PC platforms, analysts said.

While some analysts said they see a powerful combination with the Apple and IBM platforms, others cautioned that tying its fate to the AIX Unix operating system will make it difficult for PowerOpen to develop a broad market of users. IBM's OS/2 operating system is not included in the PowerOpen environment now, but IBM officials said it would eventually move to the PowerPC platforms.

PowerOpen's Dom LaCava *hopes to woo software developers*

The technical cornerstone of the PowerOpen environment is the PowerPC ABI. Once applications are written to this interface, they will run across all PowerOpen platforms, eventually offering binary compatibility from laptop systems to high-end multiprocessors.

Users will be able to work with applications based on the Macintosh interface or on the Open Software Foundation's OSF/Motif interface.

This notion of providing binary-compatible, "shrink-wrapped" applications across a range of hardware systems is the driving force behind several other such groups, including 88Open, Inc., SPARC International, Hewlett-Packard Co.'s Precision RISC Organization and Silicon Graphics, Inc.'s MIPS ABI Group.

"Our main goal is to provide high-value services to software providers," said Dom LaCava, president of PowerOpen and a former vice president at Digital Equipment Corp. Licensing fees and price lists for the porting services software that vendors will need to move applications to the PowerPC platform will be set within 90 days, he said.

IBM to extend database reach

CONTINUED FROM PAGE 1

the OS/2 and AIX database markets, key client and server environments. The OS/2 Data Manager had been bundled with OS/2, but in January IBM renamed it DB2/2 and is now selling it as a separate OS/2-based product. The expected AIX database, called DB2/6000, is based on DB2/2.

As such, DB2/6000 will likely have good connectivity to other IBM databases because IBM relational databases already do or will support IBM's Distributed Relational Database Architecture, a key part of Information Warehouse, analysts said.

Still, the basic client/server database engine IBM is using for both the AIX and OS/2 products is not widely considered technically ahead of the competition.

"They're at least two years behind other server databases in terms of function," said Rich Finkelstein, president of Performance Computing, Inc., a Chicago consultancy. Some Unix data managers have features such as stored procedures and triggers, which IBM's product lacks, he said.

In addition, because IBM has not had its own AIX relational database until now, users with Unix computers have already chosen products from other vendors such as Sybase, Inc. and Oracle Corp.

"I've already spent two years working very successfully with Sybase; IBM is a little late," said Bill Anderson, chief information officer at Prudential Securities, Inc. in New York. For the time being, Prudential is standardizing on DB2 at the high end.

Robyn Turk, a senior vice president at PaineWebber, Inc. in New York, said, "We're standardizing around Sybase as our distributed database management system. We think it scales up." Still, she added, the brokerage — an IBM DB2 user on the mainframe — will "look at whatever IBM introduces to see how it coexists and complements what we already have."

Never too late

Not all observers said IBM is too late for the client/server game. Frank Dzubeck, president of Communications Network Architects, Inc. in Washington, D.C., said, "Yes, they have missed the traditional PC market. But the database market from the distributed side will be quite different, and IBM will be competitive in the worlds that IBM has always played in. This whole thing hasn't shaken itself out yet."

In addition to Version 3.1 of DB2, which will include the distributed unit of work, and DB/6000, other pieces of the IBM announcement are expected to include:

- A callable SQL interface from within Information Warehouse. It will be based on an interface specified by the X/Open Co.
- A new release of the Data Propagator for the MVS operating system. It will now automatically or selectively update IMS or DB2 data when information in one or the other database is changed.

Many of the Information Warehouse announcements will be in the arena of distributing information off the mainframe. Information Builders, for example, will announce EDA/Extender for OS/2, which will allow PC users to access data in IBM and others' databases.

The Information Warehouse announcements were good news to user John Chatfield, a warehouse architect at the Salt River Project in Phoenix. "It's nice to see IBM put some meat around the Warehouse," he said.

If this tack succeeds for IBM, it may well lure even more users to the Warehouse concept.

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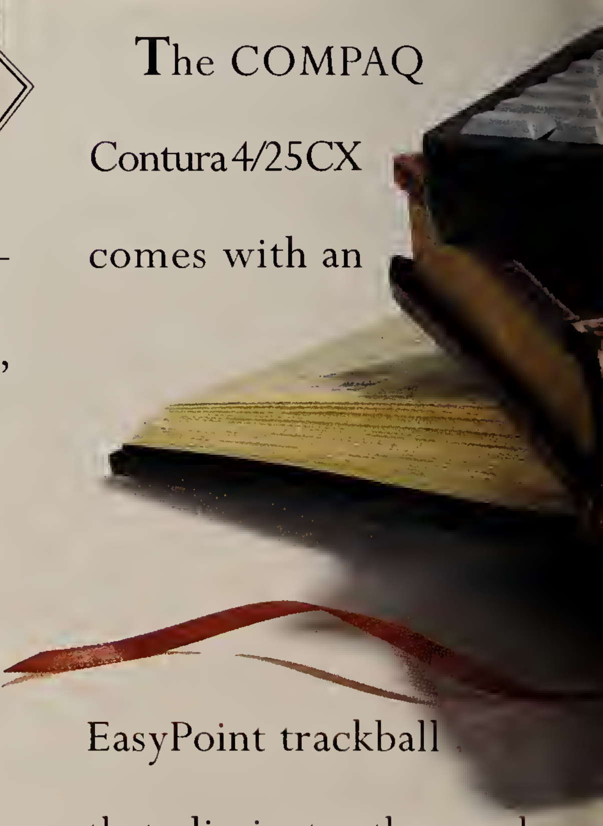

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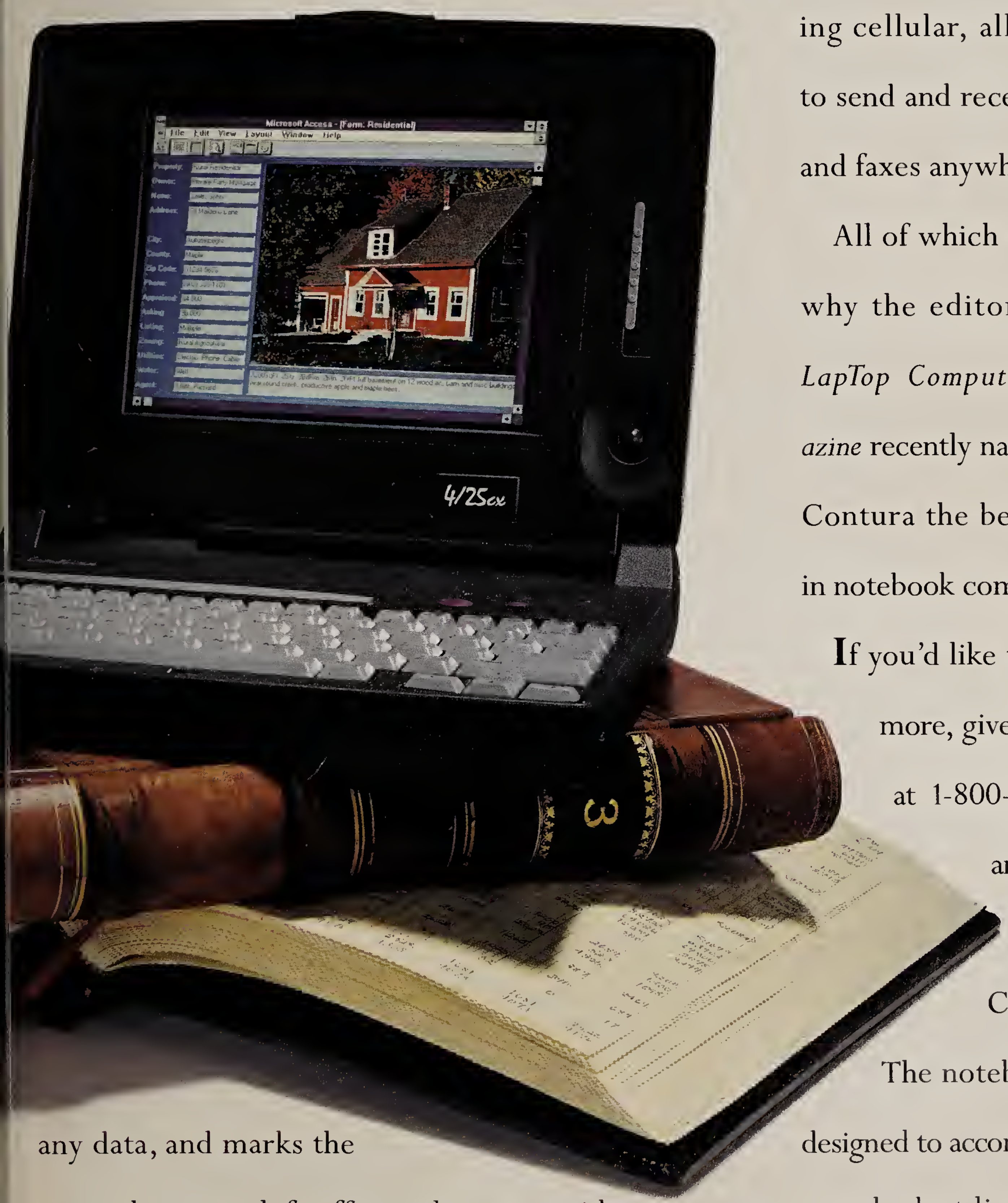
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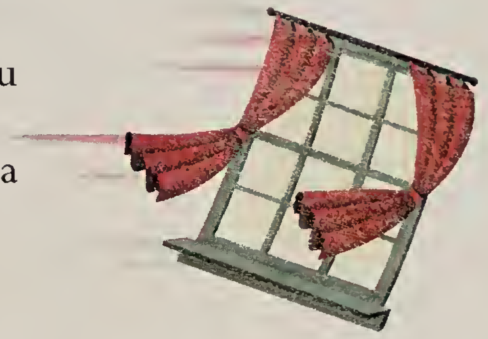

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HPCC critics seek guiding light, input

CONTINUED FROM PAGE 1

cessing supercomputers able to work at a trillion operations per second and a data network connecting research laboratories at speeds of more than 1G bit/sec. The ultimate goal was to tackle superapplications — dubbed "grand challenges" — such as climate modeling, drug design and semiconductor modeling.

Now the program, funded this year at $765 million, is attracting the attention of more down-to-earth users and applications. The U.S. Department of Commerce, which has been tapped by the new administration to be the epicenter of its technology initiatives, has established a formal coordinating group to pull together the needs of the department's dozen agencies and to develop a departmentwide vision for high-performance computing and communications.

Tech and spend

High Performance Computing and Communications program federal funding, fiscal 1993
(In millions, by agency)

Defense Advanced Research Projects Agency	$275
National Science Foundation	$226
Department of Energy	$109
NASA	$84
National Institutes of Health	$45
National Oceanic and Atmospheric Administration	$10
Environmental Protection Agency	$8
Department of Education	$6
National Institute of Standards and Technology	$2
Total	$765

Source: National Coordination Office for HPCC

"There are a lot of people in the department wanting to weigh in," said Reed Phillips, director of information resources management.

For example, the Census Bureau is testing whether parallel processing computers being developed under the program might be able to reduce the year-long effort required to tabulate the decennial census data; the National Telecommunications and Information Administration said the program may help it in its mission of measuring network performance; the Economics and Statistics Administration said the high-speed network could be used to give libraries free access to its data.

The Patent and Trademark Office would like to make its huge patent database accessible to the public via the HPCC's gigabit network. According to Thomas Giammo, assistant commissioner for information systems, high-bandwidth access to some 6T bytes of patent data would prove extremely valuable to U.S. industry, particularly manufacturers.

"President Clinton has said he wants to shorten the time between innovation and product," Giammo said. "That's us; that's what we're here for."

However, Giammo said there is an even chance at best that his application will be approved for funding under the HPCC program. He said the broad national goals that are implicit in the Gore legislation that established the HPCC are at odds with the vision of those in the "inner circle" of the HPCC.

"The [HPCC] has essentially been given to the techie crowd," which sees it primarily as an exercise in technology enhancement dedicated to the development and use of supercomputers, he said.

A senior government official involved in the HPCC, who asked not to be named, called the HPCC program plan "very fuzzy, very sketchy." He said, "What's needed now is some structure — a design for what we're going to do and who's going to do what and how it's going to be funded."

Perhaps in recognition of that need, last September President Bush established the National Coordination Office for HPCC and placed at its head Dr. Donald A. Lindberg, director of the National Library of Medicine.

Doubting Thomases

But some observers say the office is not up to the task of guiding the multiagency effort.

At a Congressional hearing on the HPCC last month, Ken Kay, executive director of the Computer Systems Policy Project (CSPP), an alliance of computer industry chief executives, said, "CSPP is concerned that the new office is chartered to provide coordination, not management, and does not have sufficient resources to provide the oversight that is needed to ensure the program's success."

Lindberg said his office serves much more than a passive coordination role. It performs administrative work, educates Congress, universities and the public and performs planning functions, he said. On the other hand, Lindberg said, he has no desire to be a "superaggressive, obnoxious, heavy-duty manager."

Indeed, many say the remarkable degree of cooperation that exists so far among federal agencies in pursuing the HPCC program stems directly from its bottom-up approach and lack of red tape (see story bottom right).

"The agencies don't think it would be a good idea to centralize management," said Dr. Daniel Masys, director of the Lister Hill National Center for Biomedical Communications at the National Library of Medicine and an assistant to Lindberg on HPCC matters. "Coordination has been sufficient to date."

Masys rejected the notion that HPCC is dominated by supercomputer bigots going after scientific grand challenges, but he did point to "competing axes," especially in the networking part of the program. "Should we put all our resources into the gigabit test beds in order to push up the apex of the pyramid, or should we expand the base? Virtually all of the agencies say the program is doing both."

Double nods

Lindberg acknowledged that getting official HPCC funding for a new application is a complicated matter requiring approval by the agency head and two White House units — the Office of Management and Budget and the Office of Science and Technology Policy.

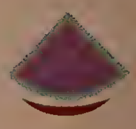
However, he insisted all reasonable uses of HPCC funds would be considered and that HPCC wannabes were encouraged to participate in HPCC activities as "guests" while negotiating the annual budget process.

The Centers for Disease Control and Prevention, the Food and Drug Administration, the Indian Health Service and the Agency for Health Care Policy and Research currently enjoy guest status in the HPCC program, Lindberg said.

Great divide

Federal funds allocated for the HPCC will be divided among four technology program areas:

- Advanced software and algorithms: **$329 million**
- High-performance computers: **$168 million**
- Basic research and human resources: **$153 million**
- National research and education network: **$115 million**



Weather forecast favorable at HPCC

Without any grand design or dictate from on high, a number of federal agencies are collaborating under the government's HPCC program to improve weather forecasting and climate modeling.

The National Oceanic and Atmospheric Administration (NOAA) — which includes the National Weather Service — is tailoring computer models for the so-called "massively parallel" supercomputers, which are being developed in part with HPCC funding from DARPA.

Meanwhile, the National Institute of Standards and Technology is developing performance measurement and tuning tools to ensure that NOAA's software takes maximum advantage of the new parallel architectures.

Eventually, data from the models will move from supercomputers at research facilities in Boulder, Colo., to high-end "visualization" workstations at National Weather Service headquarters near Washington, D.C.

This near-real-time sharing of information will be enabled by the HPCC's gigabit network, which is being developed under the direction of the NSF, the DOE and NASA. — *Gary H. Anthes*

Getting more with Gore (II)

The degree to which the government's HPCC program has moved beyond its scientific supercomputer roots is the subject of some disagreement, but clearly it is headed in a different direction. In one of its first actions this year, a Senate committee introduced a bill, popularly called "Gore II," that extends the scope of Al Gore's 1991 legislation for HPCC — which focused on research, tools and infrastructure — to include applications.

In particular, the new bill stresses education, digital libraries, manufacturing and health care. For example, the bill directs various agencies to develop the following:

- Virtual reality technology for simulating operations and other medical procedures.
- Technology to allow real-time collaboration among multiple physicians at remote locations.
- Connections of primary and secondary schools to the Internet to allow students and teachers to communicate with peers and access databases.
- Advanced systems able to store hundreds of terabytes of data, text, images and sound, while giving thousands of users near-instantaneous access to that information.

Referring to a proposal by the U.S. Patent and Trademark Office to make its patent data publicly available on-line via the HPCC's high-speed network, Dr. Daniel Masys of the National Library of Medicine said, "That kind of application is exactly what [the White House] and Congress had in mind when Gore II was introduced." — *Gary H. Anthes*

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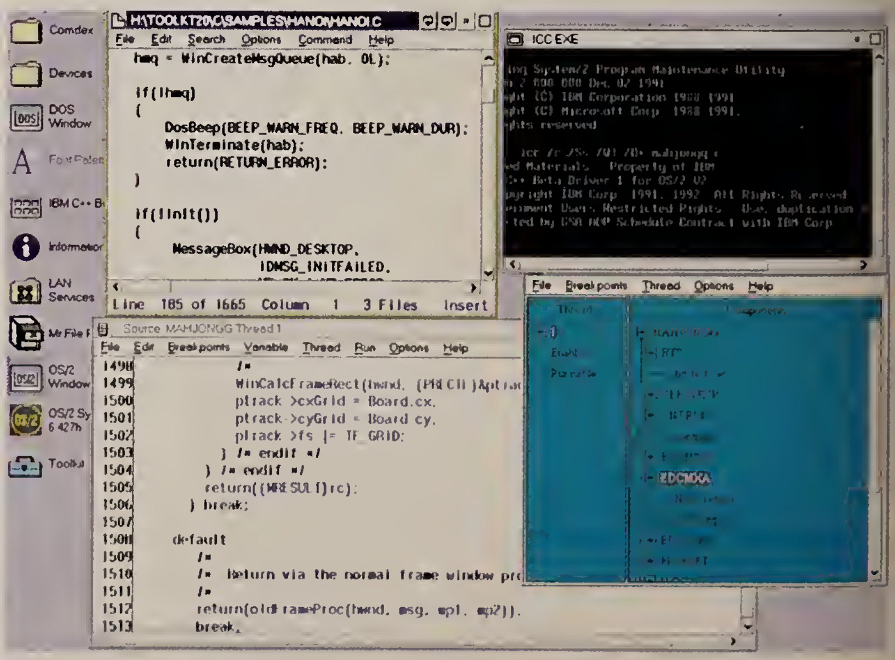

```
  hmq = WinCreateMsgQueue(hab, 0L);

  if(!hmq)
  {
     DosBeep(BEEP_WARN_FREQ, BEEP_WARN_DUR);
     WinTerminate(hab);
     return(RETURN_ERROR);
  }

  if(!Init())
  {
      MessageBox(HWND_DESKTOP,
                 IDMSG_INITFAILED,
```

Line 185 of 1665 Column 1 3 Files Insert

```
                 /*
                 WinCalcFrameRect(hwnd, (PRECTL)&ptrac
                 ptrack->cxGrid = Board.cx;
                 ptrack->cyGrid = Board.cy;
                 ptrack->fs |= TF_GRID;
              } /* endif */
           } /* endif */
           return((MRESULT)rc);
        } break;

     default:
        /*
        /*  Return via the normal frame window pro
        /*
        return(oldFrameProc(hwnd, msg, mp1, mp2));
        break;
```

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Multitasking—Windows/PM apps	Cooperative	Pre-emptive
Priority	Static (set by user)	Dynamic
Dispatchability	Process	Thread
System services	Serial	Parallel
Protection between apps	Unprotected	Protected
Kernal protection—DOS/Win/PM apps	Unprotected	Protected
File system	FAT	Enhanced FAT and installable file systems (HPFS, CD-ROM)
User interface	Windowed	Object oriented

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Software AG extends Unix tools strategy

Company gives users the means to take development off of the mainframe

By Gary H. Anthes
RESTON, VA.

Software AG of North America, Inc. today will unveil Unix versions of Natural Construct, its code generator, and Predict, its data dictionary.

The announcement follows by a year the introduction of Unix versions of its core products — the Natural fourth-generation language, the Adabas database management system and Net-Work, a "middleware" product that facilitates information sharing across dissimilar environments.

Users said the additional Unix offerings will help them migrate their mainframe applications built on Software AG products to distributed environments.

"This is a good move on their part," said Lou Kleynen, vice president of company information systems at Lechmere, Inc. in Woburn, Mass. "It allows us to complete the task of trying to develop mainframe software on something other than a mainframe. Those were the missing pieces."

Mainframe production

The products will help users who want to develop applications in Unix environments but run them on mainframes, said Michele Perry, director of Unix platform environments at Software AG.

"People are still skeptical about Unix system management tools, Unix security and so forth," she said. "They want to offload stuff but leave production on the mainframe."

Kleynen said Lechmere wants to develop applications on IBM RISC System/6000s to free up its IBM 3090/200E mainframe, where developers now eat up 25% of the capacity during the prime shift. He said it would make sense to move existing data dictionaries to RS/6000s both for applications running there and for those that will ultimately run on the mainframe.

Randy Ebeling, director of data processing at the University of Texas at Austin, said Predict for Unix will help him port mainframe applications to a Hewlett-Packard Co. HP 9000 server. However, he said, the university will not need the code generator for six months to a year, when it will begin to develop applications on the HP machine.

Faster than a ...
In December, Software AG reported that a Unix-based Hewlett-Packard HP 9000 Series 800 Model 150 uniprocessor system had run Adabas at 303 transactions per second on the TPC-A benchmark. That was 64% better than the comparable result reported by Oracle Corp.

No speed demon

Analysts said Software AG is not setting any speed records with its foray into the world of open systems, but its approach makes sense given the company's mainframe heritage and technological strengths.

"Bringing these products over to Unix means not only a port but also opening them up to work in the interoperable world of open systems," said Peter Kastner, vice president at Aberdeen Group in Boston. "That takes time. Software AG is going about it very methodically."

The products are available for Unix workstations from IBM, HP, Sun Microsystems, Inc., NCR Corp. and those running The Santa Cruz Operation's Unix. They are each priced from $600 to $34,900.

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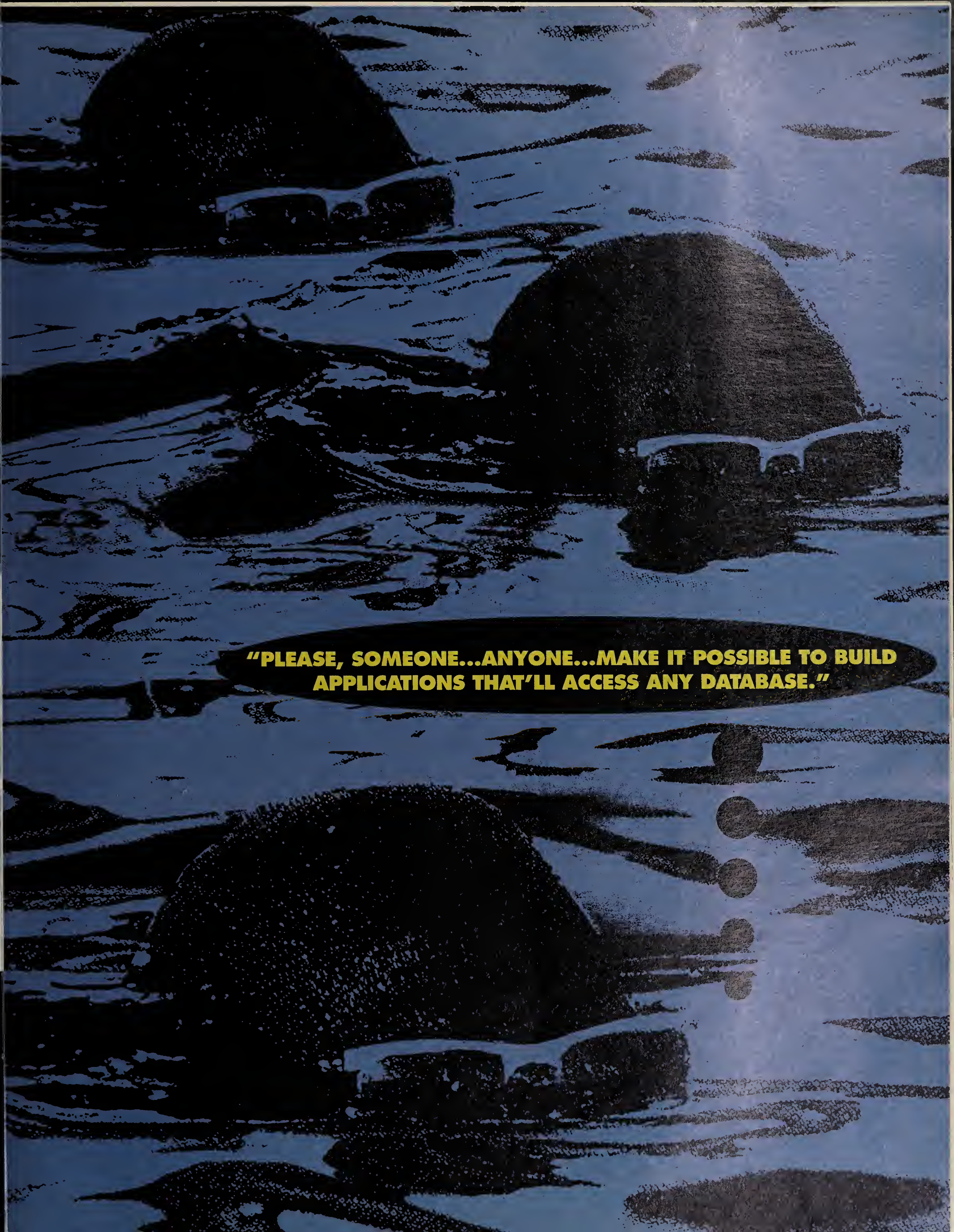
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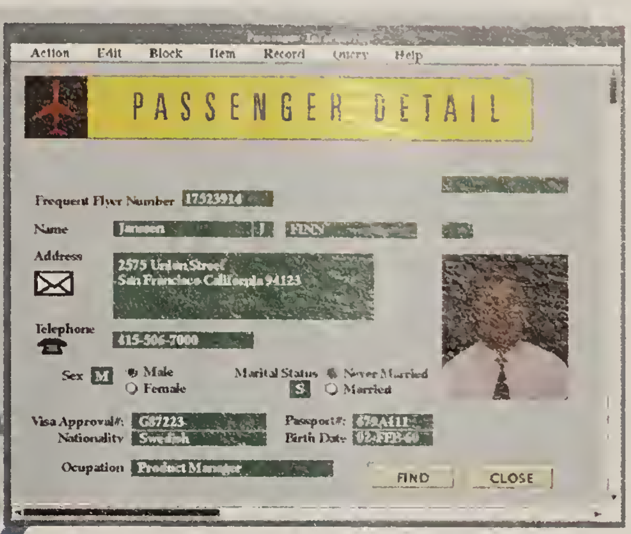
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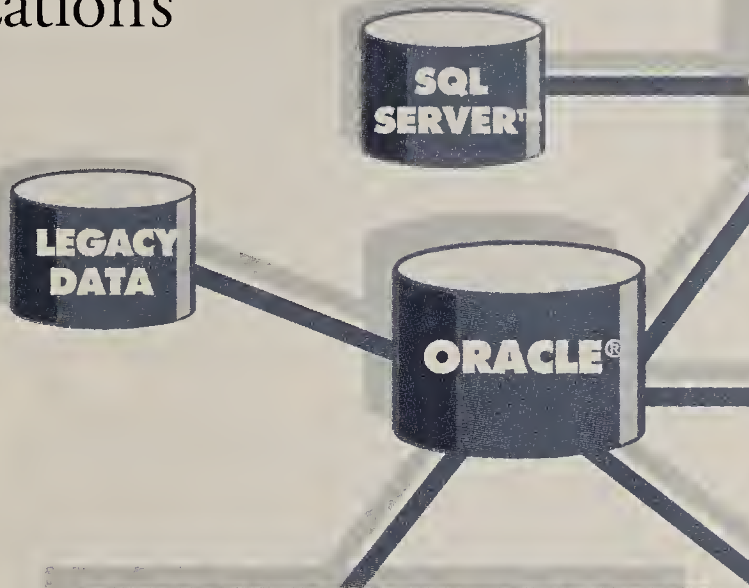
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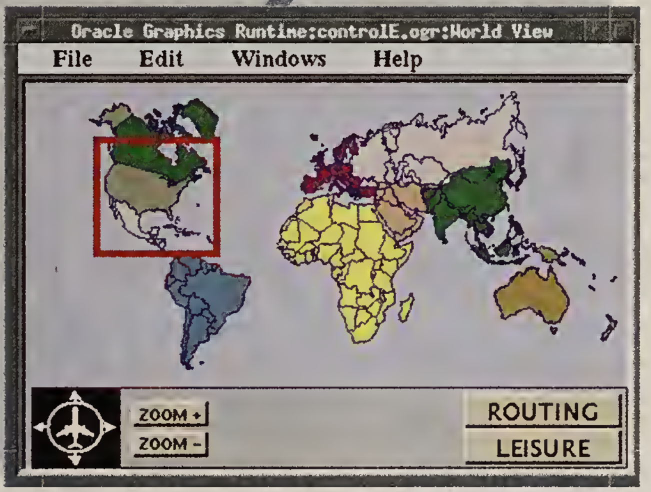
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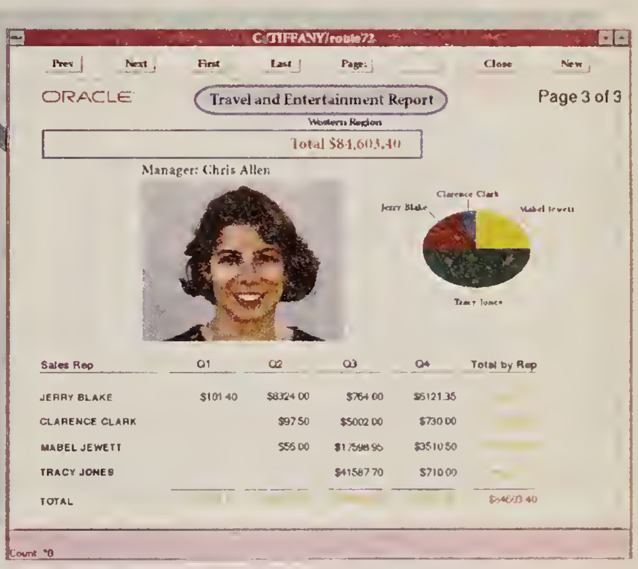
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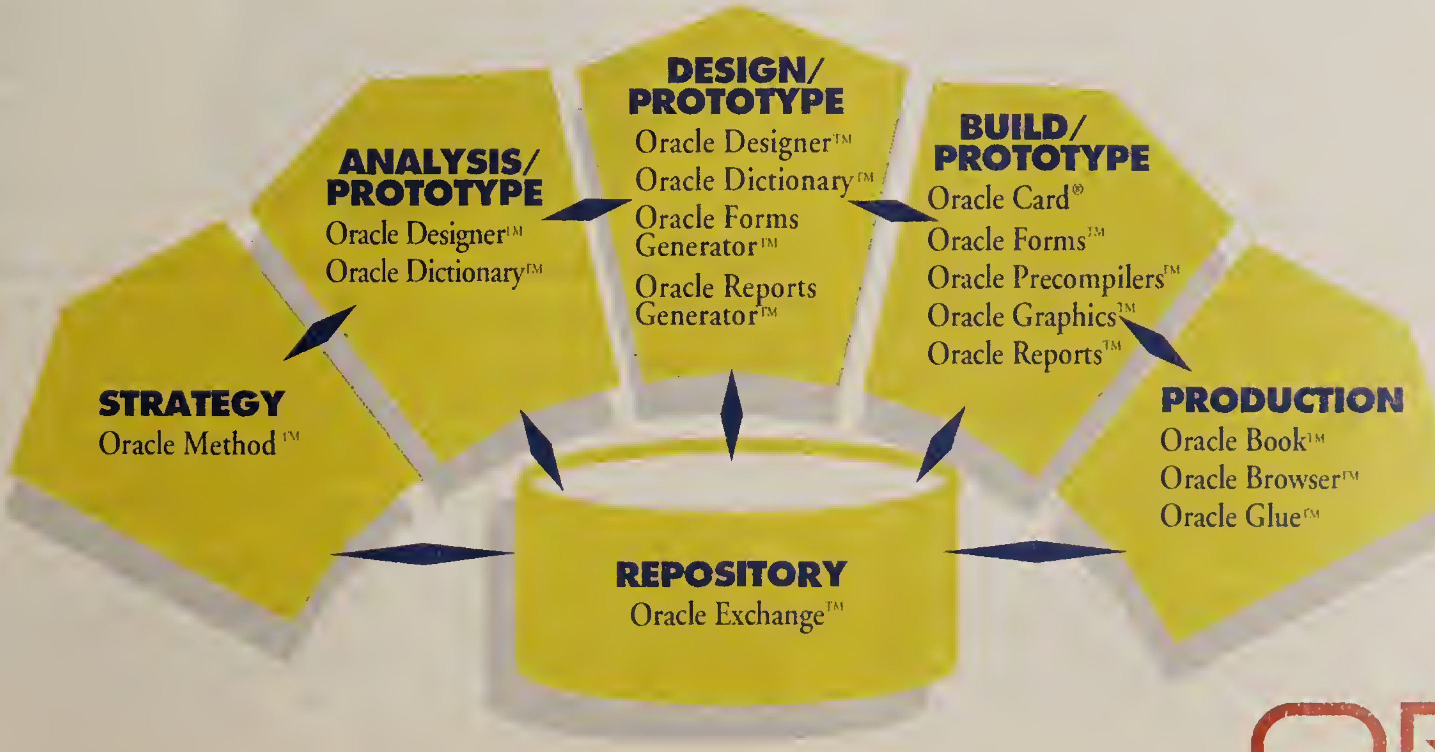

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Look, Ma (Bell) — no hands!

Wireless phones, hearing-aid-size communicators are the wave of the future

By Joanie M. Wexler

For most business users, they will get smaller and lighter. For most residential customers, they will get larger for the sake of video.

But for all of us, Alexander Graham Bell's brainchild will evolve into a different animal during the next decade: a telephone that integrates multiple forms of communications — voice, video, data, image, fax — into one device that will serve as the "graphical user interface" to the telephony world.

In the business sector, observers agreed that device will be a wireless personal communications system with a phone number that dials the roaming individual, not a fixed phone jack in a wall. Some said they expect such devices to be more the rule than the exception seven years from now, as workers are becoming increasingly mobile.

And the building blocks for bringing the various communications streams together are popping up now. For example, Jabra Corp. in San Diego is shipping a $159 product that integrates transmitters and receivers into a hearing-aid size device that sits in a user's ear (see photo). It lets a user — such as a chef preparing a meal — stroll around talking with both hands free.

Talkative roamers
A testament to the growth of nomadic phone users came from Eric Schimmel, vice president of the Telecommunications Industry Association, during a recent Subcommittee on Telecommunications and Finance meeting. He said cordless phone sales have risen from 12 million units annually a year ago to 17 million, while cellular phone subscriptions grew from 6 million to 10 million during the same period.

The same device plugs into the back of an Apple Computer, Inc. PowerBook to turn it into a "portable office, with telephone, fax and messaging, right there in your PowerBook wherever you go," said Randy Granovetter, Jabra's president.

For example, Granovetter described a scenario in which a user finds himself with extra time on his hands in an airport. "You open the PowerBook, plug in the Ear Phone, double click on your communications port software, and leave an electronic message or talk without budging from your seat."

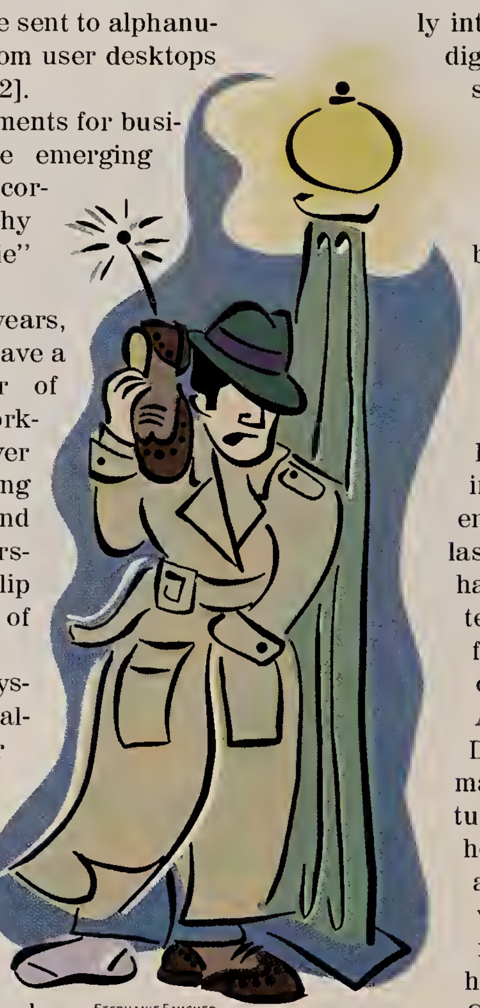
Down the road, Jabra, in partnership with several third parties, expects to offer a spread-spectrum-based station that lets roving users issue voice commands from up to 1,000 feet away.

Jabra's Ear Phone *lets users walk around talking and keep their hands free*

On the data side, Reflections Technology, Inc. in Boston makes a cube-shaped module for eyeglasses that projects what appears as a full-size computer screen to the wearer's eye.

Start-up Fourth Wave Technologies, Inc. in Troy, Mich., is "beep-enabling" Microsoft Corp. Windows applications so that files and messages can be sent to alphanumeric pagers from user desktops [CW, Dec. 21, 1992].

Such developments for business users are emerging from a growing corporate philosophy of "never say die" to accessibility.


STEPHANIE FAUCHER

"In a few years, we're going to have a limited number of knowledge workers, in that fewer people are taking engineering and scientific courses," said Phillip Evans, director of telecommunications at Perot Systems Corp. in Dallas and former president of the International Communications Association user group. "So we're going to have to make better use of the resources we do have and be able to access them quickly."

Michael Cummins, director of the telecommunications management program in the business school at the University of Miami in Coral Gables, Fla., predicted that to that end, "five to 10 years out, we'll have wireless, portable devices that can plug into a wireline interface when necessary.

"It could be a molded plastic entity with all types of access integrated or it could be modular, like a laptop for which you buy modules for cellular phones or a video display," he said.

A subset of the concept, the AT&T Videophone, is now being sold in office supply supermarkets, Cummins said. "Competing with it in the office market will be a video screen on your PC terminal," provided by videoconferencing equipment makers such as Compression Labs, Inc., PictureTel Corp. and VideoTelecomm, Inc., he said.

He also said miniature codecs — which compress video signals — will be available for laptops in six months to a year.

And for the stationary user, multimedia advocate Apple reportedly intends to plug a digital telephony stream into the back of an as-yet unshipped Macintosh to bring a T1 link to the PC.

For the home market, Philips Home Services International introduced an enhanced phone last November. It has visual and text-oriented features that comply with the Americans with Disabilities Act, making the eventual delivery of home banking and other services to businesses and homes possible.

Going a step further in the residential market, Cummins said he anticipates phones that create the "ultimate couch potato." He sees a helmet-like multimedia headset and glasses that incorporate virtual reality technology to let users simulate "bungee jumping with no fear.

"We've never re-engineered education like we have business. The concept of everyone coming to the master is no longer workable — the education has to come to us. We can't compete globally" without such a system, he said.

What can networks offer?

The shape and timing of the ultimate phone will largely be determined by the network services available to support it.

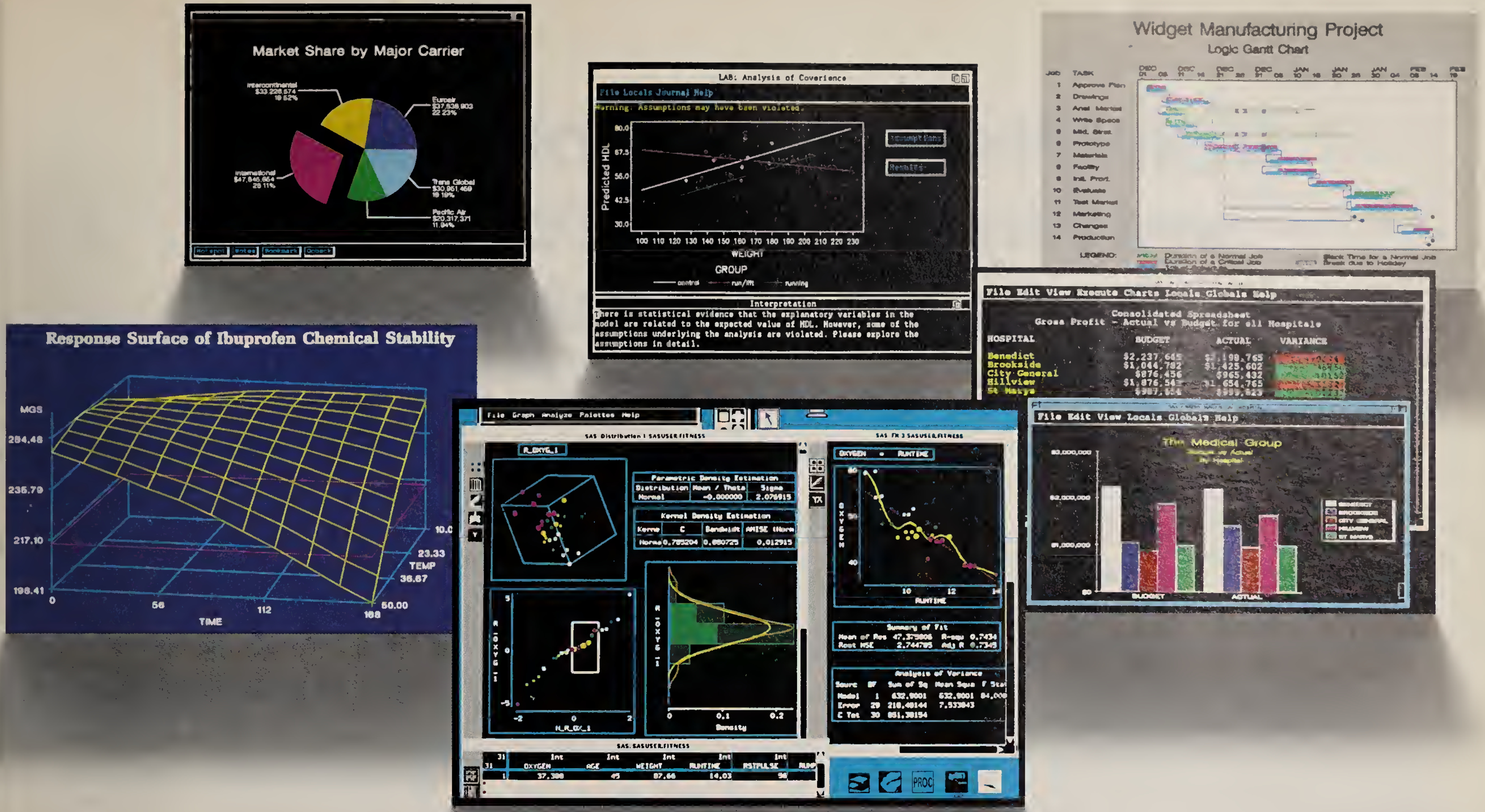
For example, "the public telephone network is getting both better and worse," said Ken Krechmer, principal at Action Consulting in Palo Alto, Calif. "It's better in that [terrestrial lines are] practically all digital, and voice quality is excellent. On the other hand, if you call me on a cellular phone, it's worse. There is no 64K bit/sec. service, and there are dropouts and cochannel interference."

When it comes to wireless, there are also bandwidth and frequency limitations to carrying larger chunks of traffic. One way to accommodate the traffic would be to "segment locations into smaller and smaller cells so you can make more efficient use of limited spectrum," said Phillip Evans, director of telecommunications at Perot Systems in Dallas.

The trend toward single phones with access to several services could finally be the kicker to Integrated Services Digital Network (ISDN).

"With an ISDN line, you can have a videoconference on your PC," said Michael Cummins, director of the University of Miami business school's telecommunications management program. "This would be possible on your laptop if there were more ubiquitous ISDN."

—Joanie M. Wexler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Warning: Assumptions may have been violated.

Interpretation

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Editorial

NetWare on a roll

With the possible exception of Microsoft's Windows NT, no product has been more widely anticipated than Novell's NetWare 4.0, which was announced last week. Scheduled to ship by the end of the month, NetWare 4.0 is the most ambitious corporate information systems product ever fielded by Novell, and reports indicate that it hits the mark.

The new NetWare comes as Novell seeks to solidify its position as the platform of choice for downsized applications. Recent International Data Corp. (IDC) numbers show that it's striking while the iron is hot. One IDC survey found that more than three-quarters of IS managers consider LANs to be high-potential platforms for future information systems. A second IDC survey revealed that about one-third of all organizations downsizing applications today are choosing Novell as their primary platform.

There are good reasons for this. LAN users are faced with three primary operating system options — NetWare, Unix and the upcoming Windows NT — with Banyan as the spoiler. NT is a crapshoot. There's no way to know how complete it will be in the first version. Unix has lots of technical elegance, but the inevitable question is, whose Unix should you choose?

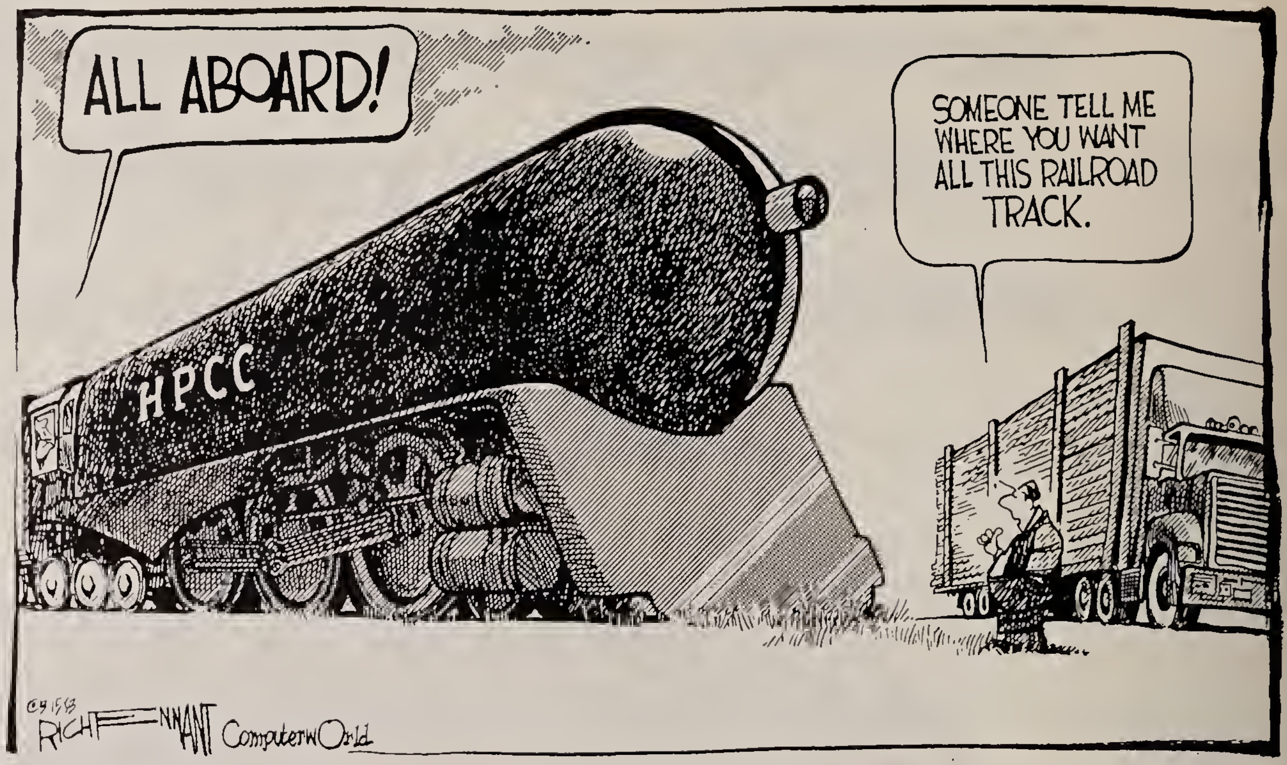
NetWare, in contrast, is a stable, elegant and well-supported network operating system. It has almost 10,000 resellers and a large base of certified support technicians. With the addition of enterprisewide directory services, improved security and increased capacity in Release 4.0, Novell is answering the biggest demands of its corporate customers. Its plans to add native TCP/IP support and improve client connectivity to non-NetWare hosts demonstrates openness. Equally important, Novell's continued willingness to work cooperatively with third parties shows that "not invented here" isn't part of its vocabulary.

The biggest enemy of NetWare 4.0 is user expectations. Anticipation for this product has been so high that anything less than overwhelming success may be seen as unacceptable. That attitude is unrealistic. Corporate users won't embrace a major upgrade of a strategic operating system without extensive testing and staged rollouts. The revisions of 4.0 are extensive enough that it will probably be a year before the largest Novell sites move over completely.

While that process continues, Novell needs to concentrate on giving its customers plenty of information about compatibility glitches and bug fixes. It should work closely with third parties to make sure NetWare Loadable Modules can be ported smoothly to the new release. And it needs to continue efforts to tie NetWare more closely into its customers' other networks.

Novell has the customer loyalty and financial wherewithal to make 4.0 a success. And it certainly has the momentum.

Paul Gillin, *Executive editor*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Letters to the editor

We do Windows, thank YOU

Hooray for Bruce J. Muckian's commentary, "Windows: Calling it awkward would be kind" [CW, Feb. 22].

After more than a year of frustration with Windows, and more than one instance of either tossing IBM equipment into the trash or trying to teach their reps about computers, I am glad to see someone else notices that the Emperor isn't wearing any clothes.

Neil Edwards
Clearwater, Fla.

Regarding the article by Bruce J. Muckian: I am disappointed that your newspaper would run an article reviewing an outdated version of a particular software.

The article states that Muckian uses Windows 3.0, and he repeatedly complains about problems with Unrecoverable Application Errors (UAE). Windows 3.1, which came out a year ago, eradicated the UAE problem entirely as well as added several new features to Windows.

His and your newspaper's failure to note this was something of a cheap shot. You can't even purchase the 3.0 version of Windows anymore!

More to the point, the reason Windows is the most popular software on the market is simple — it's easy to use and it works.

This is attested by millions of users who have switched to Windows, old DOS programs that are being updated for Windows in droves, and all the major software houses that are supporting the system with their new programs.

Craig Witz
Life Care Services Corp.
Des Moines, Iowa

I feel Mr. Muckian is truly missing the advantages of the Windows environment.

The biggest concern I have is that he has overlooked the real productivity advantage of Windows. With the Windows environment, you can leave one application without closing it and go into another.

I believe if Muckian recognized this tremendous value, he would not like to go back to an environment that requires one to close the application that is being used and then open the new application that is needed, such as exiting Lotus to go to a word processing application.

I trust no one takes this article to heart. I have been a Windows user for almost two years and have virtually gone to only using Windows-based software, both personally and professionally.

Having worked in both the DOS and Windows environments, I can truly say that I am more productive and have more *fun* in the Windows arena than I ever did in DOS.

Ric Calson
Fresno, Calif.

The commentary by Bruce J. Muckian resembles that of the old fuddy-duddy rejecting the idea that the car might actually be better than the horse. He is stuck in the history books somewhere; he isn't even found on CompuServe.

To demonstrate this, consider his bio: "He works with Windows 3.0." And he's complaining about Unrecoverable Application Errors? Instead of holding back the clock, he should advance to Windows 3.1 and experience the two-step processing of closing the Windows' windows: Alt F4 and Enter. No mouse required, either.

David S. Mohler
Dayton, Ohio

I almost — I'm sorry — I *did* laugh when I read Mr. Muckian's editorial about his Windows woes. Under his picture you mentioned he works with Windows 3.0.

Is he still working on a vintage 1985 IBM AT? Ask him if Boeing is still selling 707s. And then tell him to catch up with the rest of us.

William H. Hodson
Richmond, Ind.

I can't imagine that Bruce J. Muckian is still using an earlier version of DOS than 5.0. Yes, Windows has its share of bugs, Unrecoverable Application Errors and the new general protection faults, but it packs many features into a fairly reasonably sized package.

The bottom line is that Microsoft has helped the industry grow, mature and standardize. Granted someone is getting rich doing so, but that's what our free enterprise system is all about. If Microsoft fails to meet the expectations of the computer community, I'm sure that any number of companies are poised to take over.

William L. Kellogg
Enfield, Conn.

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Too many deals are lost over the fine print

Thomas J. Buckholtz

They agree on the specifications. They agree on the schedule. They agree on the price. Do they have a deal?

Not immediately. Probably not for weeks. Perhaps not for months. Maybe never.

What frequently happens in the information technology marketplace at this stage is that a customer and a vendor — we'll call them BuyCo and SellCo — bog down in pages of "fine print" known as "boilerplate."

Other markets manage to avoid this kind of stalemate. Haggling over boilerplate for each shipping container would sink international commerce, but that doesn't happen — the international maritime marketplace came to an understanding centuries ago, and so have other industries. We have to be different, however. We go through considerable pain and delay.

First, BuyCo and SellCo must decide whose boilerplate is to be used. (Usually, SellCo wins this first skirmish.) Then, they must agree on who will type the amendments.

Once those points are settled, the real wrestling begins — over whether BuyCo can comply with a requirement to return or destroy all copies of SellCo's software when use ceases; over rights to custom software developed under the contract; over SellCo's liabilities for various possible types of damages; over indemnification against third-party claims of proprietary rights violations; and so on.

JANELL GENOVESE

BuyCo's project management discusses each issue with SellCo's sales force. They compromise, subject to review. Lawyers and management perform their reviews. If they suggest new wording, then even more discussion ensues.

During these discussions, the clock continues to run. BuyCo cannot derive competitive advantage from products and services it has not received. SellCo is not receiving revenue on this would-be deal.

Usually the parties do complete a deal. But, a noticeable fraction of the time, negotiations are abandoned after two to six months.

Once, a company I worked for, recognizing that it was caught in a quagmire, did exactly that. It took us about a week to evaluate a competing product, and three weeks later, we signed a deal with the second company, which found our terms and our boilerplate perfectly acceptable. The originally intended SellCo lost what would have been its second largest sale ever.

Each year, thousands of talented managers, technical staff members and lawyers devote significant time to negotiating computing and telecommunications boilerplate. Is this productive? Is it necessary?

Sometimes it is. Sometimes all this attention to detail significantly improves a deal or prevents a deal that would have been built on false expectations.

More often, however, I suspect the parties would be happy with marketplace-standard wording and the comfort that most business was done based on it.

Let's liberate millions of people-hours tied up in needless boilerplate negotiations. Buyers would be able to spend their money on products and services rather than on negotiations. Vendors would sell more and lower their costs per sale. We'd certainly all be a lot more productive. We might even be more competitive.

Buckholtz is a consultant in Washington, D.C. Until recently, he was commissioner of the General Services Administration's Information Resources Management Service, where he led the deployment of computing and telecommunications throughout the U.S. government.

Pay for training now or regret it later

LISTEN UP! *by* Elaine Bond

Years ago, the major systems vendors led the way in educating users. This education was accomplished in ways that minimized the impact on user organizations. Costs were indirect (reflected in the price of the product). There were a limited number of easily identifiable individuals who needed training. Most important, the rate of change was modest and controlled.

Today, things are different. User organizations have inherited the responsibility for education and retraining, and they must do the job in the face of far greater obstacles. Limited budgets leave very little room for training. Products now come in a dizzying variety. And now entire populations, not just a few technologists, require training.

Rolling out client/server architectures requires significant amounts of training for end users, application developers and operations and support personnel. And training in the specifics of the technology is just the beginning. Personnel must also be trained in new applications and new operational procedures. But for most organizations, training — particularly technical training — is considered overhead, something that is very difficult to cost-justify.

So what can an IS manager do to make the job a little easier?

First, recognize that training is a critical factor in the evaluation and purchase of client/server technologies. Training support (quality and quantity) must be evaluated in product selection. Training costs must be built into project plans. You can pay now by including formal training as an explicit line item or later in low productivity or underuse of the product. Either way, you will pay the price.

We should also seek greater cost-effectiveness in the availability and delivery of training. There are redundancies in product content and certification programs across multiple vendors. This unnecessary duplication could be eliminated by investigating the basic knowledge required for specific tasks and developing appropriate training material built around generic or "core" content. This core content must be widely recognized and accepted.

Once a person is qualified or certified in the appropriate core material, unique vendor or product-specific material can be delivered more efficiently and effectively from both a user and a vendor perspective.

Finally, even more can be done to improve on the already significant gains in "ease of use." People well-versed in training and learning theory should have greater influence on product design.

We hear about the value of cross-functional teams in many other businesses. We know that having manufacturing and service specialists participate in product development improves product quality. Why not have training specialists critique products based on how much it takes to learn how to use them? Human factor labs are a step in the right direction. If they discover that a feature is hard to master, maybe it's not worth the cost to put it in, or maybe there is another way to offer the same capability.

The bottom line is this: In spite of the rhetoric associated with the term "ease of use," more people need more training in more subjects than ever before. And as with most things that are associated with multivendor client/server architectures, we need some new models.

Bond is a Chase fellow and senior technology consultant at The Chase Manhattan Bank NA. She is a founder of the user advocacy group Open User Recommended Solutions, or OURS.

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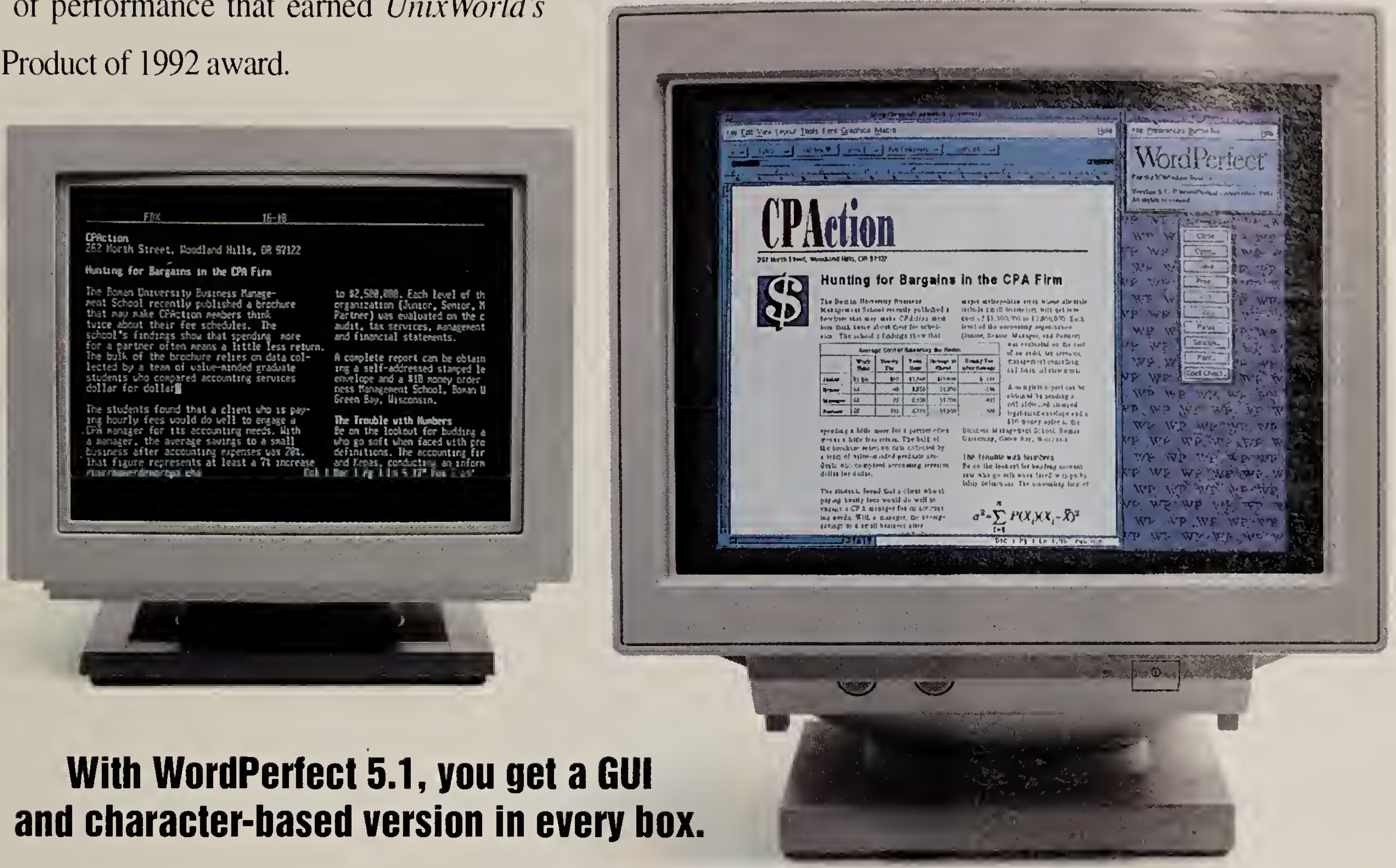

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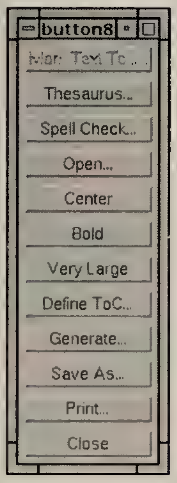

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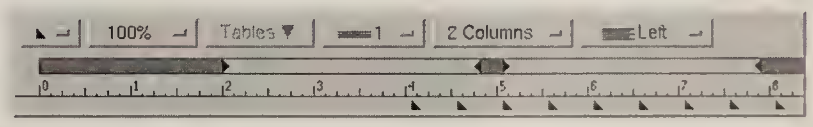

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Commentary

Charles Babcock

Solaris in NT's shadow

As all eyes watch for Windows NT, the long-awaited new kid on the block, there's a kid already in the neighborhood who deserves a second look.

This is a youngster who is already dressed in 32-bit threads, networks easily among diverse groups and always carries a full box of tools. And it's a rare 1½-year-old that can be described as tested and mature.

We're talking about Solaris, the desktop version of Unix from SunSoft, a business unit of Sun Microsystems. Solaris grew out of SunOS 4.1, which had its roots in the University of California at Berkeley's Unix. Solaris 2.0, however, is compliant with System V Release 4.

SunSoft has great ambitions for Solaris 2.0, even though it tends to hang out on familiar SPARCstations and SPARC-based servers. SunSoft will soon dress Solaris up in new clothes and send it out to mix with that noisy, pedestrian MS-DOS crowd. Just how well the youngster goes over remains to be seen. So far, the PC community has shown little proclivity toward Unix, preferring to be dazzled by the mere prospect of Windows NT.

Solaris sports two or three appealing new characteristics.

At $795 per copy on RISC workstations, it is cheaper than other versions of Unix. And unlike other versions, Solaris' acceptance is being driven by the engine of Sun's hardware sales. In six months, Solaris will have reached a million users, says Ed Zander, head of the SunSoft unit.

If there is a growing appetite for Unix on powerful PCs, Solaris 2.0 for Intel X86 will be launched by the end of this month to meet it. With X86 Solaris, SunSoft customers have the option of designing applications with the same core operating system and networking capabilities on servers and clients. In this sense, Solaris 2.0 and Solaris for X86 will have more in common than Windows and Windows NT in client/server configurations. To encourage that possibility, SunSoft is likely to drop the price of Solaris for Intel X86 below the SPARCstation level to $500 or so, the first version of Unix at PC prices.

As a desktop system, Solaris has its drawbacks. If Windows NT is hungry for memory, Solaris is hungrier. It needs a minimum of 12M bytes of RAM, with 16 recommended. It also needs 200M bytes of hard disk space.

Solaris comes equipped with Sun's Open Look graphical user interface, even though OSF/Motif is the GUI of choice on Unix desktops. Sun SPARCstations serve as the largest installed platform for OSF/Motif, but Sun stubbornly refuses to sell it.

An area where Windows NT has the potential to outshine desktop Unix is in its ability to run with few changes on multiple platforms. There's irony in the fact that a product from fiercely proprietary Microsoft may be able to out-Unix Unix by establishing an open environment, but Windows NT threatens to do just that in the 32-bit arena.

Solaris and the other members of the disjointed Unix community cannot hope to compete with Windows NT on Intel desktops unless they minimize the somewhat artificial distinctions between their brand names. Customers don't know the differences between Univel, Destiny, Xenix, UnixWare, AIX and The Santa Cruz Operation's Open Desktop, but they can grasp that the applications of one won't necessarily run with the others.

No doubt most desktop forecasters are predicting that Solaris will be eclipsed by Windows NT. But how far NT will progress into client/server applications remains an open question. That will be decided by people responsible for implementing client/server applications, who tend to be system administrators and network managers more than end users and who may see merit in Solaris.

Babcock is *Computerworld*'s technical editor. His MCI Mail address is 575-2737.

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PCs and Software
Portable computers

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Board Watch

Christopher Lindquist

Take it with a grain of salt

Probably one of the biggest advantages of being connected to bulletin boards is getting your questions answered. No matter what your query, there will be someone out there with a solution or a suggestion. And those answers are free. However, remember that the advice may be worth only what you pay for it.

■ Here's something from the "People who have too much time on their hands" file. A guy on a fairly major BBS posted a want ad looking for a minicomputer or mainframe that he could use "to run my house, i.e. lights, water heater, furnace. . ." A series of incredulous responses followed that asked whether the fellow was prepared to build another house to store his new toy, including cooling systems.

"You're trying to kill cockroaches with nuclear warheads," came one reply. Another stated that a small main-

Lindquist, *page 43*

AST boosts high-end service

By Michael Fitzgerald
IRVINE, CALIF.

AST Research, Inc. recently announced new products and a new service program but coupled them with less than stellar news on its near-term financial prospects.

On the product side, AST replaced its high-end Power Premium PC series with Premmia, which features local bus graphics, enhanced upgradability and Pentium capability.

AST had expected to introduce the Premmia line in January but delayed the release to make some customer-suggested enhancements, such as a shift from normal to buffered serial ports and a network-upgradable flash BIOS.

The delay "hurts [AST] in the market [a little]; one reason they've been doing so well is they've been in the right place at the right time with the right products," said Andrew M. Seybold, editor in chief of "The Outlook on Professional Computing," a newsletter published in Brookdale, Calif.

Users contacted said they liked the new products, though at least one thought them pricey.

Ashvin Dave, director of database and technical services at Midas International, Inc. in Chicago, said there was roughly a $700 difference between a Bravo and a Premmia based on the same processor, or approximately $300 more than he would have expected.

Pricing on the Premmia systems, which start with a 33-MHz 486DX and range to a 33/66-MHz DX2, starts at $2,095 and tops out at $4,195.

AST used a proprietary local bus scheme that it calls LocalLink, which is based around ATI Technologies, Inc.'s mach32 graphics accelerator. AST claims a 200% increase in graphics performance for Windows applications. It also built in the ability to integrate Ethernet on the motherboard, a strategy it calls "personality modules."

AST Customer Care is a new program in which AST will offer 24-hour, seven-days-a-week toll-free technical support and a three-year warranty for most desktops.

PCs are money in the bank

Texas Commerce Bank speeds loan requests, drops error rate

By Michael Fitzgerald
HOUSTON

When opportunity visits your neighborhood, it can walk right in your door if only the door is open in the first place.

That is the attitude at Texas Commerce Bank NA, where Allen L. Cournyer, senior vice president and manager of the data center, has jumped into personal computing to take advantage of changes in Texas' state banking regulations.

"We're basically in the process of [data center] consolidation as we move from a unit bank environment to a branch banking one," Cournyer said. As recently as 10 years ago, Texas banking laws restricted branch banking to the point that it was difficult even to get automated teller machines installed, he said.

But when Texas legalized branch banking in 1987, Texas Commerce went on a tear to centralize data operations and reduce duplicated functions.

The shift in laws "handed us an opportunity to use new technology, so we've done a lot of re-engineering," Cournyer said.

A big part of the change was the move to a local-area network-based integration project, with a focus on imaging.

To speed its loan-making process, Texas Commerce originally intended to give its loan officers access to seven mainframe-based systems, including credit bureaus and its own internal loan-processing and credit-card systems. It found, though, that it would have to put as many as five terminals on a desk to attach to all these systems. So it opted to put PCs on each officer's desk and design a front end to integrate the various mainframe systems onto the PC.

Texas Commerce found that it was able to use an imaging system from ViewStar Corp. as a front end into the various mainframes. It also found that shifting from a centralized scanner to fax machines in the branch offices helped it save courier time by faxing the files into its five Compaq Computer Corp. fax servers.

The faxes could be converted to a simple .TIF file, then converted to ViewStar's proprietary imaging format. Faxing over phone lines was less expensive than installing scanners and dedicated T1 lines in each of the bank's 92 branches and transmission was four times faster.

Through applied use of the technology, Texas Commerce said that it has gained obvious benefits.

"We have doubled our volume of business without increasing staff," Cournyer noted. "We've also been able to offer new products as we've gotten better at figuring out how to automate things." One example is the bank's loan-by-phone program.

Cournyer said error rates have also dropped, and perhaps most useful to customers, a personal loan request that used to take up to two days to process now goes through in under three hours. Virtually no paper is generated in the loan-approval process.

Furthermore, the bank wants to move more ad hoc reporting down to the PC level to save on mainframe programming costs.

Mark Green

Texas Commerce's Allen Cournyer *is taking advantage of LAN-based computing*

To this end, Texas Commerce is looking into using 5¼-in. optical discs for easy data access. While it has some optical jukeboxes tied to its image system, Cournyer said this limits what PC users can do easily because they cannot access information on a localized disk.

While it is building many new applications in a client/server environment, the bank is not hurtling down the path to "rightsizing." Cournyer said the costs of rewriting applications is still too high for that.

At the same time, mainframes continue to offer certain economies of scale that PCs and LANs lack. For instance, Cournyer said his mainframe storage systems can back up 10G bytes of data a hundred times faster than a LAN.

ON SITE

Texas Commerce Bank NA
Houston

Challenge: To take advantage of changes in state banking laws and establish itself in consumer lending in Texas by providing faster service.

Technology: ViewStar Corp.'s imaging software and a LAN based on fax servers from Compaq. Seven mainframe databases are linked into this system as well.

Results: Able to double its loan volume without increasing staff; able to cut loan processing time from as long as two days to under three hours.

THE KITCHEN SINK IS

If you're getting the feeling the T4500 series represents a new standard in business notebook computing, you're right.

Our T4500C features an LCD TFT active matrix color screen that can display a kaleidoscope of 256 simultaneous colors from a palette of 185,193. Our T4500 offers a large, bright, easy-to-read 9.5" VGA display with 640 x 480 resolution and 17:1 contrast ratio.

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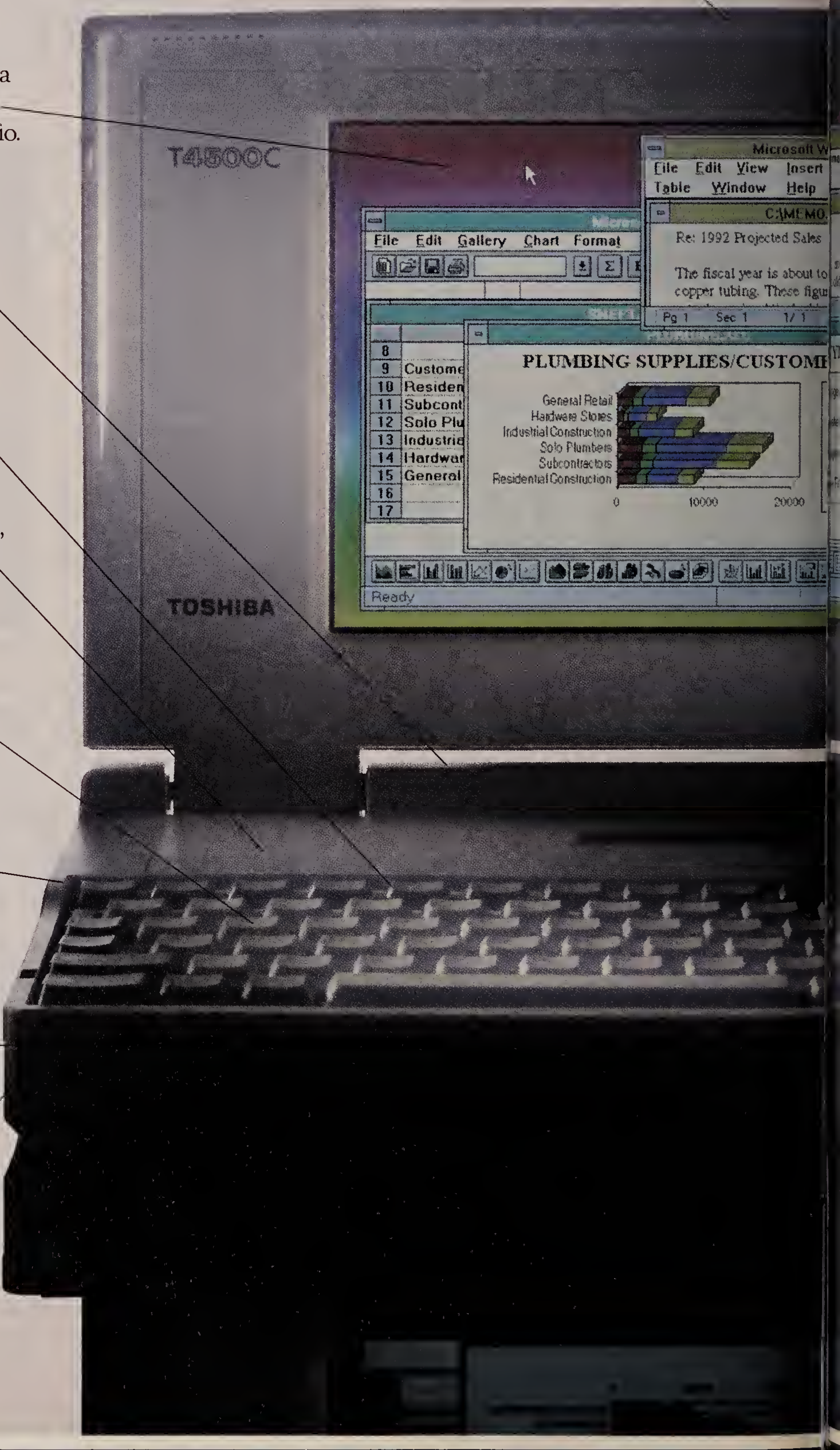
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INTRODUCING THE TOSHIBA

OPTIONAL.

The T4500C's dimensions: 11.7″W x 8.3″D x 2.0″H.
The T4500's dimensions: 11.7″W x 8.3″D x 1.8″H.
Both fit into half of a briefcase.

Windows® 3.1 and DOS® 5.0 with Ultrafont™ come pre-installed.

AutoResume lets you start where you left off without rebooting and automatically saves your material when you turn the power off.

Our Quick Charge capabilities allow you to charge the battery while you're working.

Featuring AutoResume, AutoSave, Advanced Power Management, and CPU Sleep Mode, our MaxTime™ power management system helps you get the maximum out of every battery charge.

Quickread LCD status icons allow you to check a host of functions (including remaining battery time, keyboard status, and power-saving mode) at a glance.

An industry-standard PCMCIA 2.0 slot accepts removable hard drives, data/fax modems, network adapters, and other expansion options.

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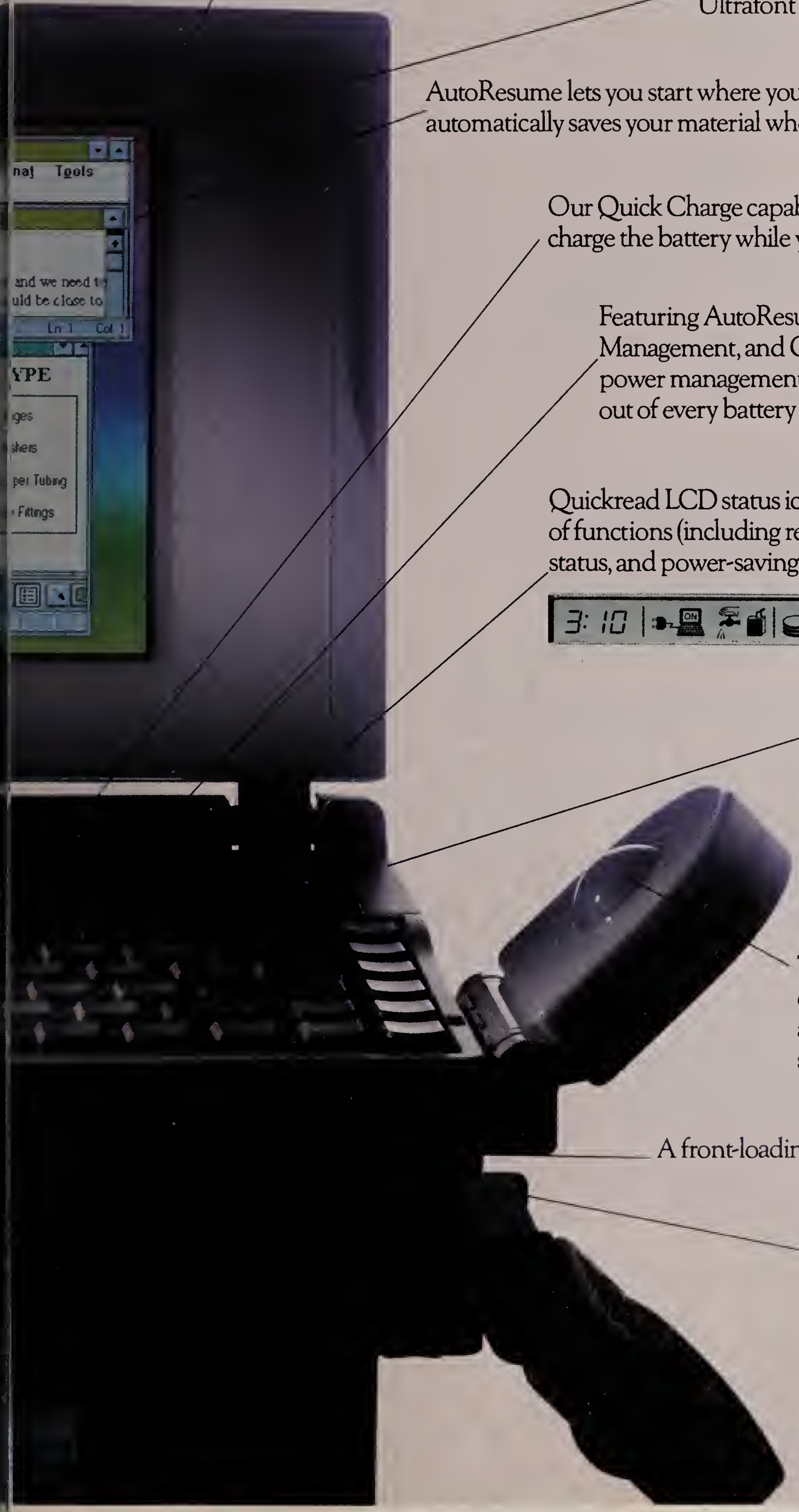
A front-loading floppy drive provides easy access.

Both the T4500 and the T4500C weigh in at about 6.5 lbs.



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intel inside

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HELP LINE

Ami Pro 3.0

This is another installment in a series of articles containing questions commonly asked by users and responses from vendor support lines. This week's focus is on Lotus Development Corp.'s Ami Pro 3.0 word processor.

Q: When some EPS graphic files are imported, the frame displays an X and the message "This graphic will not display on the screen. However, it will print on PostScript printers" appears. Why doesn't the graphic image display on screen?

A: Some EPS files do not include a graphic screen representation.

This depends on what application created the EPS. Some applications include a TIFF or Metafile section within the EPS file that will display on the screen, while others do not.

For example, creating an EPS file using Windows' PostScript printer driver does not create a graphic screen representation. Regardless of whether the EPS file is able to display on the screen, it will print to a PostScript printer.

Q: When I import a gray-scale TIFF file, the image is adjusted. How can this be disabled?

A: When a gray-scale TIFF file is imported, Ami Pro automatically adjusts the brightness and contrast settings to produce what the program believes is the best image if AUTOCONTRAST=YES is in the AMIIMAGE.INI file.

If you have made changes to your TIFF file in another program and do not want Ami Pro to make any adjustments in brightness and contrast to imported TIFF files, AUTOCONTRAST must be set to NO.

Note: If changing the AUTOCONTRAST setting to NO in the AMIIMAGE.INI file does not disable autocontrast, copy the file AMIIMAGE.INI from the Windows program subdirectory to the Ami Pro program subdirectory.

Once AMIIMAGE.INI is copied to the Ami Pro program directory, the autocontrast setting will be read.

Q: WordPerfect documents that use the Courier font import into Ami Pro using the TrueType font Times New Roman 12 rather than Courier. How can Courier in WordPerfect documents be maintained when imported into Ami Pro?

A: Remove or remark out with a semicolon (;) the line Courier New = 12 in the [FontIgnore] section of the AMIWP.INI file to allow WordPerfect documents to import with the Courier font.

Q: When Ami Pro 3.0 is started, the error message "Error 51 - macro MACRONAME.SMM, not found" appears. How can that message be eliminated?

A: This message will display when starting Ami Pro 3.0 if the line "AutoMacroLoad=" in the AMIPRO.INI file is set to automatically run a macro that no longer exists.

To prevent this error from displaying, change the Tools/User Setup/Program Load option to a macro that exists, or delete the macro name from the Program Load edit box.

Q: Can the SmartIcon palette created in Ami Pro 2.0 be converted to a SmartIcon set for Ami Pro 3.0?

A: The SmartIcon palette used in Ami Pro 2.0 can be converted to a SmartIcon Set for Ami Pro 3.0.

The Ami Pro 2.0 file, APIB.INI, located in the Windows program directory, can be copied to the Ami Pro 3.0 Icons directory, where it will be available as an Ami Pro 3.0 SmartIcon Set.

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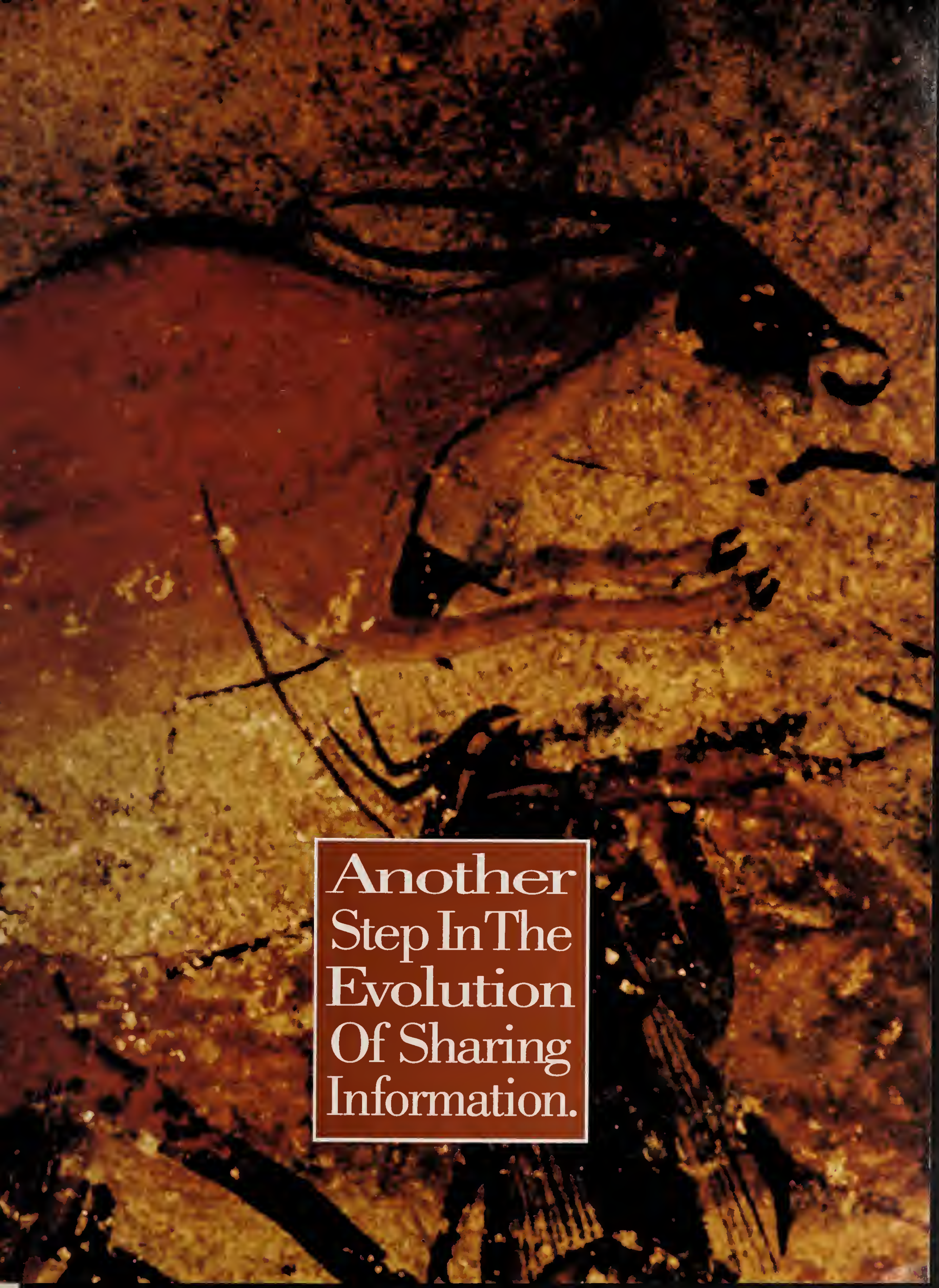

Another
Step In The
Evolution
Of Sharing
Information.

Open Protocols. The Abilit With The Rest Of Th

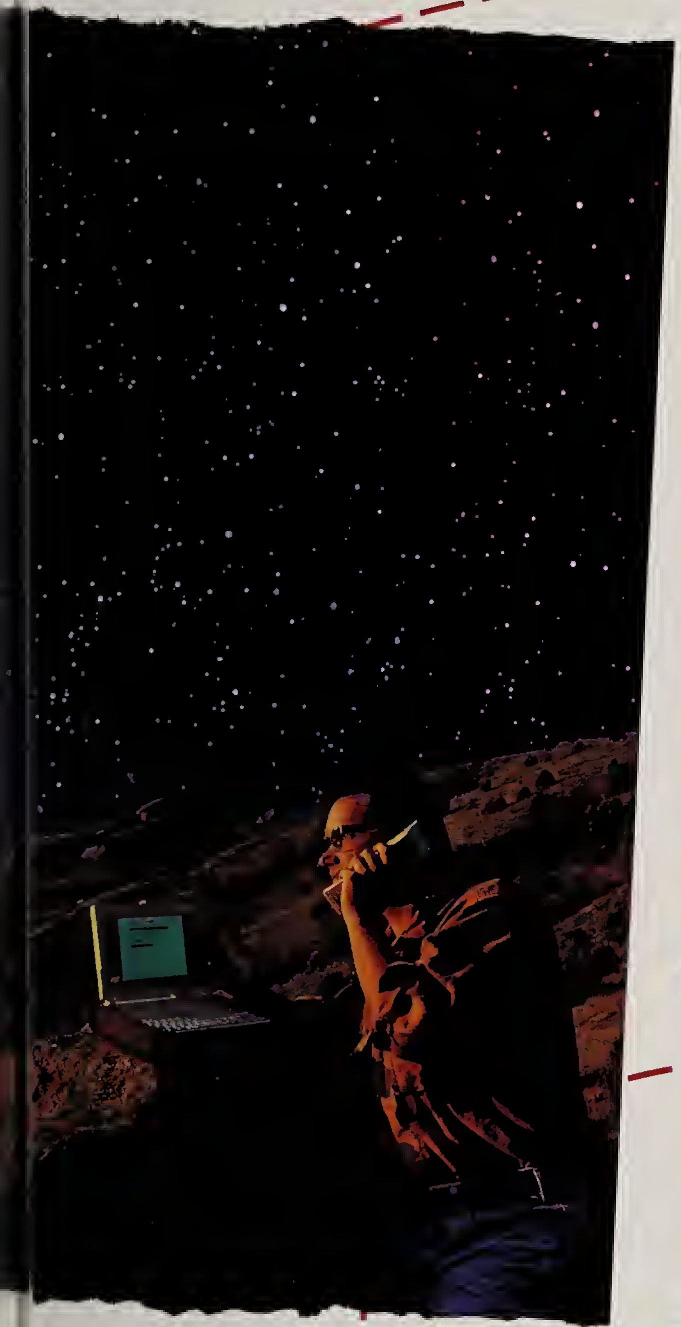
Alan contacts Elizabeth, an independent market analyst in Miami, for interest rate predictions. Since most major vendors support APPC, Alan can choose from a variety of analysts who are supported by different computer systems.

How well you perform depends on how well you communicate. Alan, the company's chief financial planner, is working from his Montana getaway on next year's projections. His company's software is based on APPC, the Advanced Program-to-Program Communication protocol. That puts Alan and his laptop in communication with all the information he needs.

James is the corporate application development manager. He made sure the application his team developed was written in APPC so that it could communicate with other APPC programs running on different operating systems in multiple networks.

Alan asks Susan for next year's marketing budget. Susan uses an APPC application to retrieve data on her LAN for advertising and sales. She then requests corporate data on public relations expenditures.

To Communicate
e Species.



Since everybody's so APPC-friendly, Alan quickly finishes his projections, then checks his favorite electronic bulletin board for the best fly fishing spots in Montana this time of year.

APPC. Breaking Communication Barriers.

Alan connects with Dawn in the L.A. office for current inventory. She has all the figures except those for Western Europe. No problem. APPC's ability to communicate over wide area networks makes the Munich office as close as the first floor.

Somewhere out there are millions of computer users asking themselves one question: *Why can't we all talk to each other?* You can—with Advanced Program-to-Program Communication (APPC), a protocol that lets users access data on different machines and different operating systems.

APPC's advantages make it a good protocol choice for many mission-critical, client/server applications. It is already supported by most major vendors and is used worldwide. For decision makers whose careers are sometimes on the line, that translates into low risk. For application developers, APPC lets you work smarter—you can develop a program once and move it to other operating systems without major rework. And network managers and administrators get the added benefits of using one high-performance protocol on both local area and wide area networks.

Sharing data through the right protocol is serious business. That's why IBM supports multiple protocols. We're serious about breaking down communication barriers. And from a standpoint of productivity, interoperability, adaptability, and affordability, APPC is about as serious as you can get. Regardless of your origins.

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☐ INVESTING IN APPC: A BUSINESS PERSPECTIVE – *answers the question "Why you should invest time and money in APPC."*

☐ *A free subscription to* THE APPC CONNECTION, *our bimonthly newsletter.*

☐ COMMUNICATING WITH APPC AND CPI-C – *discusses the technical advantages of APPC.*

☐ NETWORKING WITH APPN – *discusses how APPN simplifies the networking of APPC applications.*

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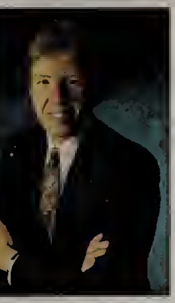
Commentary

Paul Gillin

Tidings from the West Coast



OVER AT CUPERTINO, CALIF.-BASED SYMANTEC, an interesting new technology code-named Bedrock promises to make cross-platform development a whole lot easier.

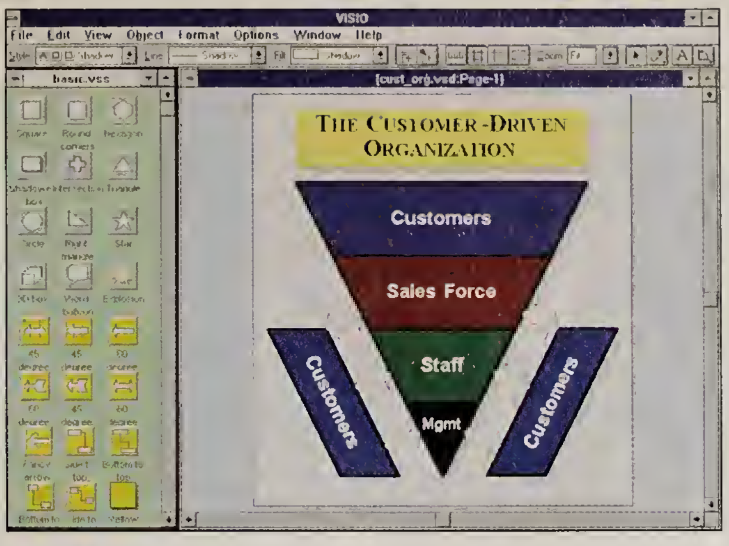
Bedrock, which won't ship until late this year, will be a development framework based on a collection of more than 1,500 Dynamic Link Libraries (DLL) that span DOS, Microsoft Windows, Windows NT, OS/2, Unix and Apple Macintosh platforms. The idea is that developers will link the Bedrock DLLs, which are basically little packages of pretested code, into their programs at compilation time to fit the appropriate operating environment.

For users, the benefit of Bedrock could be faster availability of new programs across platforms. For developers, Bedrock could make development much faster, although Symantec says program performance takes about a 10% hit.

Of course, all of this is vaporware at the moment, and Symantec doesn't exactly have the marketing muscle of Microsoft or Borland. But it has the right idea at the right time.

NOT EXACTLY DESKTOP COMPUTING but a good idea nonetheless comes from tiny Red Brick Systems in Los Gatos, Calif. Red Brick said IS managers want to give end users decision support access to production data (they do) but don't want to tie up the production database to do it (they don't). Red Brick offers tools to extract production data and run queries against it.

The Red Brick Warehouse consists of a loader for getting data out of the production database, a database server module and a proprietary SQL-based query tool.



Visio *provides templates for common charting jobs*

Red Brick has recently received boosts from deals with HP and IBM, but it's still a small firm, with only 10 customers and expensive ($50,000 and up) technology. Front-end tool support is also thin right now. Still, Red Brick has a good product and a niche, and that's what counts these days.

IT'S NICE TO SEE a product hit the streets that genuinely solves a common problem. Shapeware Corp.'s Visio is a Windows drawing package that is so elegantly simple, you wonder why nobody ever thought of it before.

Visio [CW, Feb. 8] assumes that most of us can't draw basic things like flow charts with the drawing tools that are out there. That's because the tools make you carefully craft each element, type and center text and draw lines to connect the boxes to one another.

Seattle-based Shapeware has the machine do the dirty work. Visio gives you templates for common charting activities. To use, simply drag the shape onto the page and link it to other shapes with a line. The lines stay connected to the shapes even when you move them. At $249, Visio is pricey, but it's truly useful and unique, at least for now.

Gillin is *Computerworld*'s executive editor. His MCI Mail address is 575-4120.

Lindquist

CONTINUED FROM PAGE 39

frame might function nicely as a furnace replacement. Of course, if more people thought this way, John Akers might still be planning a future at IBM.

- The "PC to mainframe" conference on one board was not exactly alight with incisive commentary until someone posted a simple message: "Is anybody out there?" The reply: "Indeed, we are. It just seems mainframers don't have much to say on PC networks."
- I've finally done some exploring with my new Internet connection. The amount of information available is astounding, and connections with mail service can be had for less than $200 per year. One word of advice: Buy an Internet tutorial before you start. Moving around the networks is often like driving in New York City without a map: You know there's a lot to see, but you have no idea how to get there.
- And if you had an Internet connection, you could be looking at the verbal warfare occurring in the comp.sys.next.advocacy group.
- While some Next customers are taking a "silver lining" view by saying that having Next put its efforts behind supporting multiple platforms is best, many users of Next hardware are feeling quite betrayed. The biggest problem appears to be that Next has not defined what its hardware customers should do... er, next.

It's sad to see the only workstation with a sense of style fall out of the market. If you have any epitaphs for Next, send a message via MCI Mail at 549-8464, CompuServe with 72360,2005 or Internet under chrisl@netcom.netcom.

Lindquist is a *Computerworld* West Coast correspondent.

Software piracy

First raid tests felony law

By Kim S. Nash
and Christopher Lindquist
BOARDMAN, OHIO

When Rusty & Edie's, the third-largest bulletin board in the U.S., was shut down recently by the Federal Bureau of Investigation, electronic debates raged across CompuServe over whether Rusty & Edie's in fact allowed subscribers to pirate software, as the FBI alleges.

The arguments may be moot, however, because while the FBI decides whether to press criminal charges against the bulletin board service, proprietors Russell and Edie Hardenburgh have been wiped out of business.

At last month's raid on the 6-year-old bulletin board — run out of the Hardenburghs' home — the FBI seized Rusty & Edie's servers, PCs and peripherals supporting 124 incoming nodes and 19G bytes of storage space. The equipment will sit idle in an Ohio warehouse until FBI and Software Publishers Association (SPA) officials comb through the bulletin board service's massive files and documentation to determine whether Rusty & Edie's supported or encouraged illegal downloading of copyrighted software by its 14,000 subscribers worldwide.

The investigation could take several months, said Gary West, a special agent at the FBI office in Youngstown, Ohio.

This is the first raid since Congress raised software piracy from a misdemeanor to a felony in October. Under the law, convicted pirates face up to five years' jail time and $250,000 in fines if they are found to have stolen more than 10 copies of a package with a value of more than $2,500.

The law shows that "the government is now willing to put resources behind this crime," said Ilene Rosenthal, SPA's general counsel. SPA estimates put U.S. losses from software piracy in 1991 at $1.2 billion. Of the 218 audits and lawsuits filed last year against alleged pirates, 5% of them were against bulletin board services, training facilities and schools. The rest were corporate cases.

"Bulletin boards make up a small percentage, but that doesn't mean they're not important," Rosenthal said, adding that raids on other bulletin board services are imminent.

For an $89 annual fee, Rusty & Edie subscribers could read, upload and download many popular copyrighted business and entertainment programs, Rosenthal said.

Some reservations

Some PC users doubt the charges. "I never saw anything that was a commercial product on the board, but perhaps I didn't have access to some areas," said Lee Parsons, a PC user who belonged to Rusty & Edie's for about six months. "I do know that they made extensive and repeated warnings about uploading [copyrighted material]."

"With a board as large as theirs it could be pretty impossible to track and regulate incoming software, but I know that when I saw copyrighted stuff uploaded, it was removed right away," another former subscriber said.

The SPA contends that "several hundred thousand dollars" worth of copyrighted games and business applications had been downloaded from Rusty & Edie's, including titles such as Broderbund Software, Inc.'s Printshop Graphics, Quarterdeck Office Systems' Q-Ram, Microsoft Corp.'s Flight Simulator and Adobe Systems, Inc.'s Illustrator.

A more exact figure will not be available until the FBI combs through Rusty & Edie's files and documentation. The value of the stolen goods "probably exceeds tremendously" that of the pirated software from the SPA's raid late last year of Davy Jones Locker, a bulletin board service in Millbury, Mass. [CW, June 15, 1992].

In the three months prior to that crackdown, approximately $675,000 worth of software was distributed illegally, Rosenthal said. "And that's a small board, with only five or six lines coming in" compared with Rusty & Edie's 124 nodes, she explained. Rusty & Edie's has logged more than 3.4 million calls since opening in 1987.

At a glance

1992 was a busy year for the SPA:

Phone calls per day on the antipiracy hot line: **30**

Number of organizations the SPA pounced on: **747**

Audits and lawsuits: **218**, resulting in $3.9 million paid in fines and penalties

Cease and desist letters: **529**

New Products

Faxes

Bit Software, Inc. has introduced BitFax 4.0 for DOS faxing software.

Features and enhancements for the product include a simplified user interface that offers multiple interface options such as pull-down menus, function keys and keyboard shortcuts with the ALT key. Full compatibility with BitFax for Windows and a "what you print is what you fax" feature are also provided, the company said.

According to the company, a small memory requirement of 80K bytes maintains conventional 640K bytes of memory, enabling users to have a sufficient amount of obtainable memory even when all functions have been loaded onto extended memory.

BitFax 4.0 for DOS costs $89.

▶ *Bit Software*
47897 Fremont Blvd.
Fremont, Calif. 94538
(510) 490-2928

Trio Information Systems has started shipping DataFax, a Microsoft Corp. Windows-based fax software package.

DataFax includes a Captive quick fax capability, a hypertext search-and-find engine and language-sensitive cover sheets that can recognize country codes. Compatibility with most fax modems and optical character recognition with conversion to leading applications are also provided, the company reported.

Pricing for DataFax begins at $79.

▶ *Trio Information Systems*
Suite 615
8601 Six Forks Road
Raleigh, N.C. 27615
(919) 846-4990

Software application packages

The Triangle Software Division of Datawatch Corp. has announced Version 3.9 of Virex antivirus software.

This upgrade is targeted at the recently discovered CPro, a Trojan Horse virus. CPro masquerades as an update to a well-known compression program.

When a user attempts a CPro application, the Trojan Horse will try to format mounted hard disks and floppy disks, succeeding only when it tries to format floppy drives, the company reported.

Version 3.9 of Virex costs $99.95.

▶ *Datawatch*
Triangle Software Division
3700-B Lyckan Pkwy.
Durham, N.C. 27707
(919) 490-1277

Dimensional Insight, Inc. has introduced Diver Release 2.0 for Windows.

The product is a Microsoft Corp. Windows-based interface for CrossTarget, Dimensional Insight's data analysis and reporting solution. While navigating data, users can continually track their location with a pop-up visual display or "console."

Dive-down paths can be saved and recalled, and the product offers expanded graphics, a true calculated field capability and a new grouping feature that restricts and examines chosen groups of data.

Diver Release 2.0 costs $750 per station.

▶ *Dimensional Insight*
99 S. Bedford St.
Burlington, Mass. 01803
(617) 229-9111

The Retail Products Division of Autodesk, Inc. has introduced Release 2 of Generic 3D, three-dimensional conceptual modeling software.

Features include AutoCAD compatibility, linear dimensioning and text lines, cursor alignment/tracking and a sculpt mode editing tool.

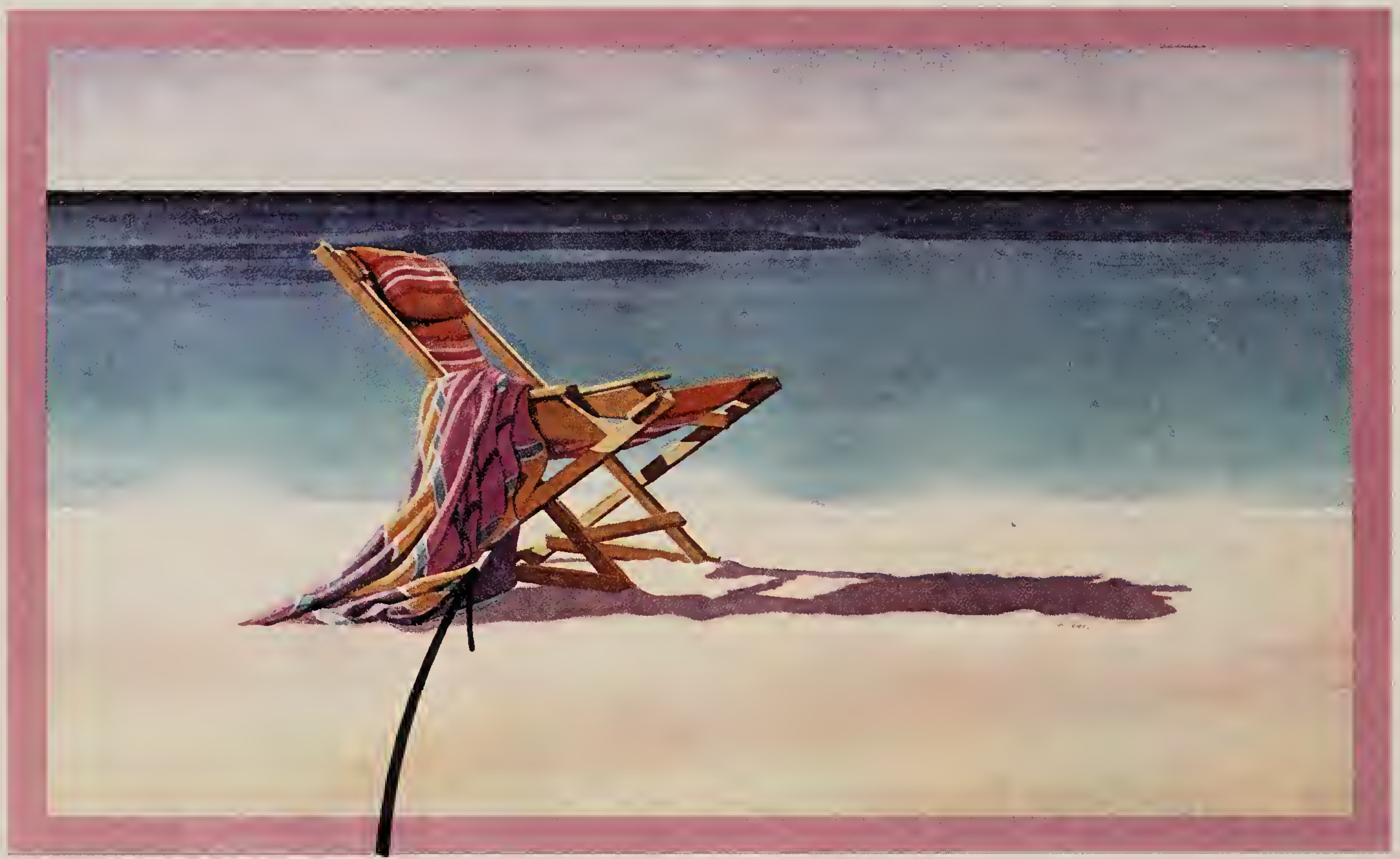
"Bite-sized" exercises and tutorials and a library of sample symbols are included. Nested commands enable users to transport an original drawing command across the screen and snap to objects without interruption.

Requirements include an IBM PC AT, Personal System/2, PS/1 or 100% compatible machine; 1M byte of random-access memory; MS-DOS 3.0 or higher; and a hard drive with 7M bytes of available space.

Generic 3D Release 2 costs $399.

▶ *Autodesk Retail Products*
11911 N. Creek Pkwy. S.
Bothell, Wash. 98011
(206) 487-2233

Document image management. If the idea seems a bit overwhelming, look at the picture. Close your eyes. Listen to the surf gently rolling in. This is about as nerve-racking as we get.



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If you're considering PC-LAN document imaging, shopping for the right system can be very confusing. Not so with LaserData. Now you can deal with one team of experts, supported by one comprehensive product line. Our team designs, refines and installs each imaging system we sell. Our systems are modular and flexible, so you can manage all data types and build production business applications quickly. Open architecture makes integration simple and easy, on your existing computer equipment. With more than 1,000 systems installed in 33 countries, it's no wonder businesses and governments trust us. Call or write for more information. You'll find we're a breath of fresh air.

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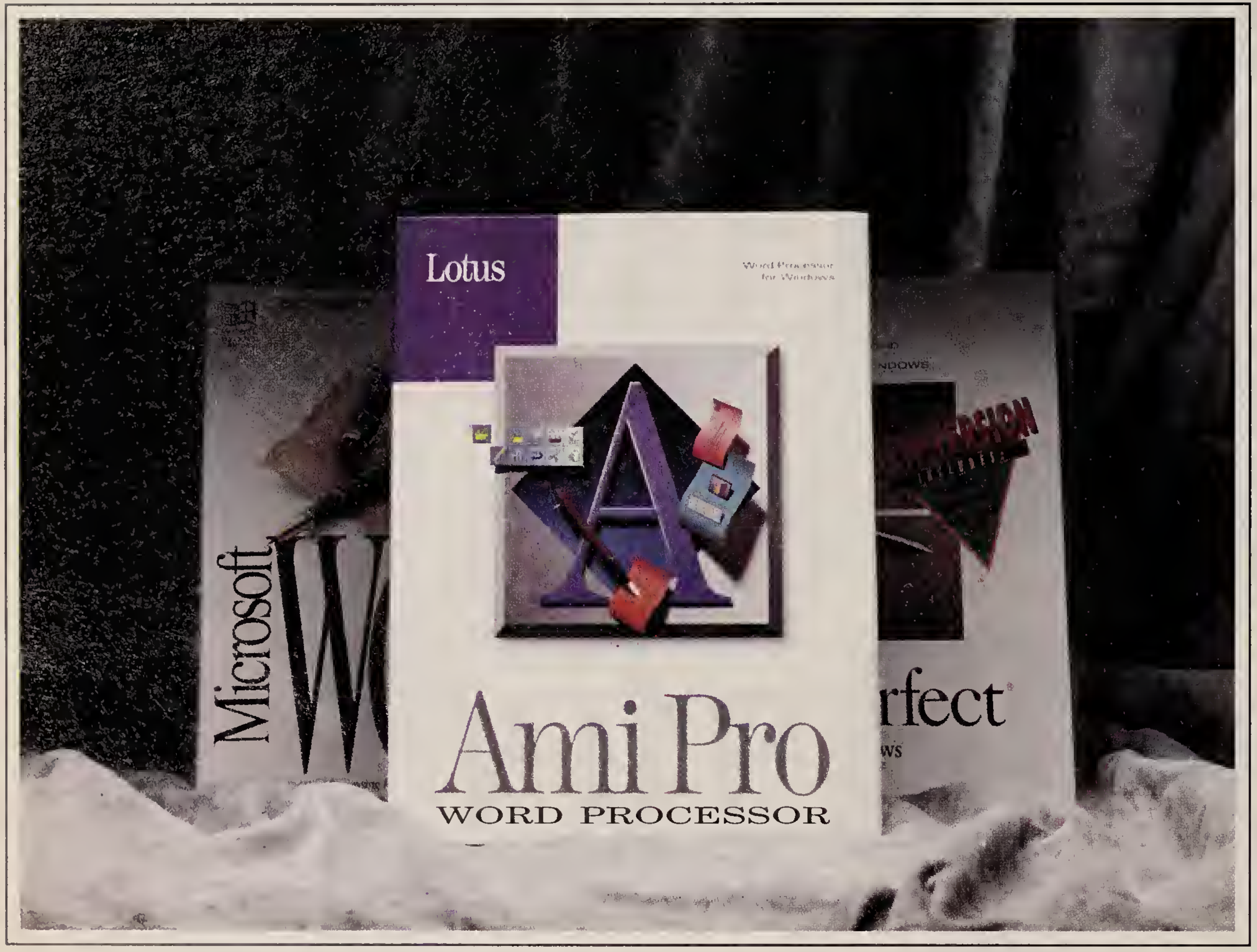
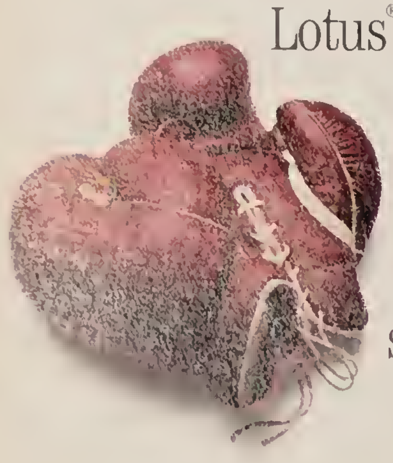
There's quite a battle raging between Word and WordPerfect.

For seco



In the War of the Words, there's one clear winner. Ami Pro.

Word vs. WordPerfect.® It's billed as the battle of the world's two greatest word processors. Hardly. According to most independent judges, Lotus® Ami Pro® 3.0 is the clear and convincing leader of the word processing pack. Word and WordPerfect are following its lead, scrapping it out for second and third.



Check the rankings.

Ami Pro 3.0 is ranked the #1 Advanced Word Processor for Windows™ by the National SoftwareTesting Laboratories. (9/92)†

Recently, in an InfoWorld review, Ami Pro received the highest score ever given for a Windows word processor. (9/28/92)

Lotus Ami Pro captured the 1992 PC Computing MVP Award. (12/92) (Note: The MVP award also appears in the new WordPerfect ad. That's last year's award.)

PC Magazine recently named Ami Pro one of the Best Products of 1992. They said, "No other product can match…the sheer pleasure of using it." Microsoft Word received an Honorable Mention, with the comment "…it's a step behind Ami Pro." (1/93)

Now, perhaps the battle royale between Word and WordPerfect has been put into perspective.

And you probably wonder what it is that makes Ami Pro clearly better?

†Among all word processors tested. Software Digest, Ratings Report, Vol. 9, #6, Sept. 1992 Reprints available upon request.*On weekdays, plus 7AM to 4PM on Saturdays. **Offer expires 9/30/93. Call fo

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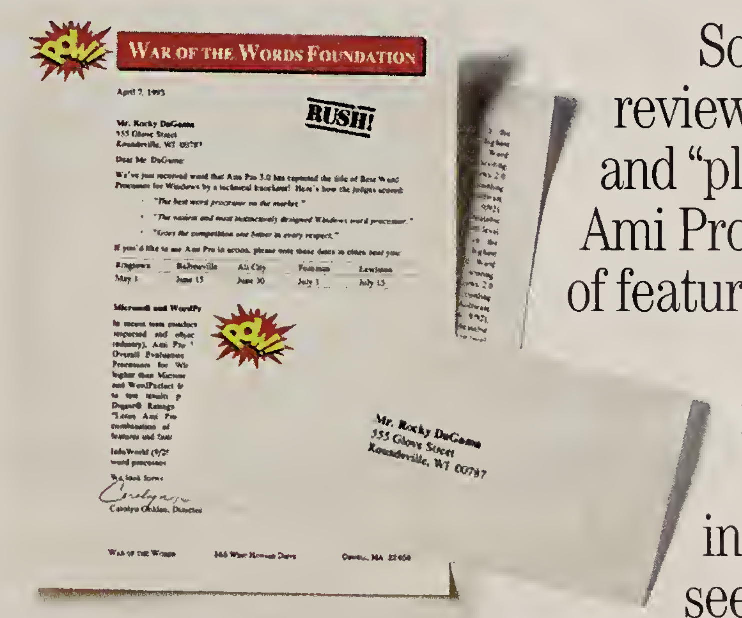
nd place.

The battle of the features.

Simply put, Ami Pro is a faster, easier, friendlier word processor to use. It does so many things with so little effort, most people never even bother to open the manual.

To name a few, there's real, honest, no ifs-ands-or-buts WYSIWYG. There's Fast Format, for quick repetition of text formats. There are customizable, editable SmartIcons.™ Not to mention SmartClick, where the right mouse button will automatically shift you to the appropriate dialogue box to change fonts, styles or frame formats, based on what you're doing.



There's automatic renumbering of lists. Preview of Style Sheets. QuickStart on-line tutorial. Free 24 hour a day technical support.* And to ease your mind, a 60-day money back guarantee of your complete satisfaction.

And, if you're switching from WordPerfect for DOS, relax. Ami Pro makes it easy with a number of special features. Like seamless conversion of WordPerfect files. And a SwitchKit so that when you type in WordPerfect commands, Ami Pro shows you how to perform the same functions using pull-down menus or one-click SmartIcons.

You call the winner.

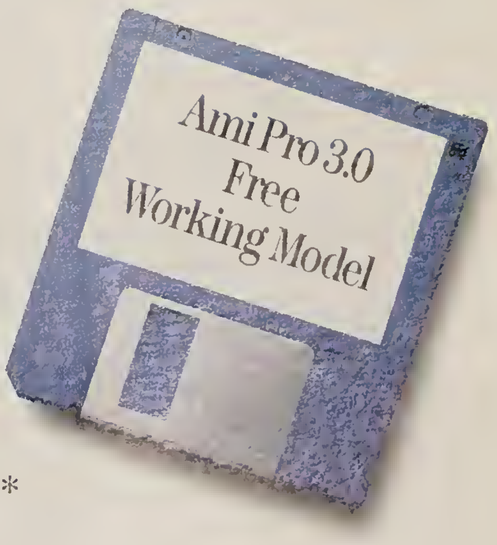
So what drives hardened reviewers to use words like "love" and "pleasure" when describing Ami Pro? You can't tell from a list of features.

You've got to experience it. In your office. On your PC.

Call us for a free working model of Ami Pro and you'll see for yourself.

If you're like most people, once you actually sit down with Ami Pro, you'll definitely choose it. Over Word. Over WordPerfect. Over every other word processor out there.

Call Lotus today, at **1-800-872-3387, ext. 8453**, for your free working model or to upgrade from your current word processor for just $129.**



Lotus. Ami Pro 3.0

Word Processor for Windows

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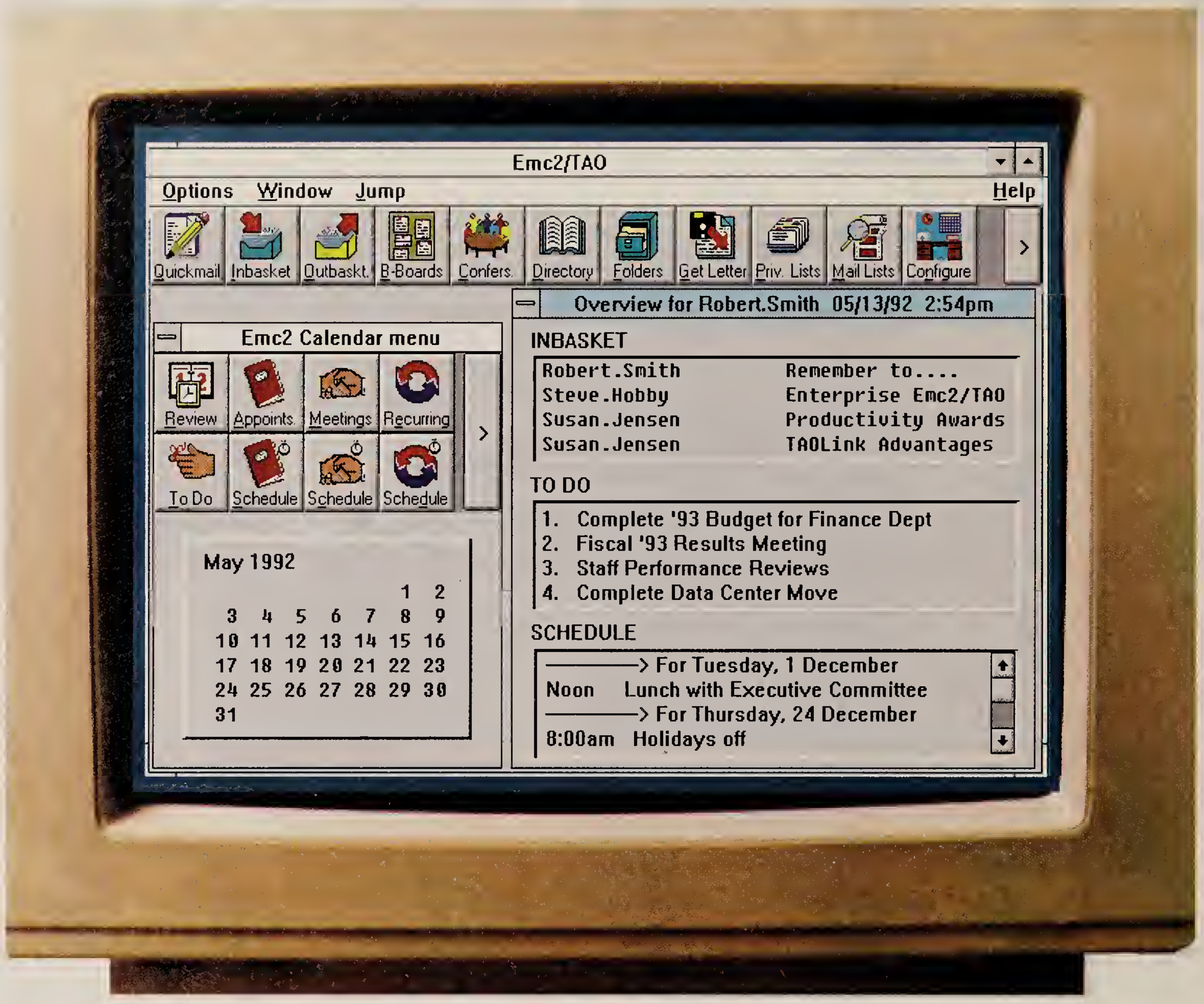
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May 1992

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Overview for Robert.Smith 05/13/92 2:54pm

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1. Complete '93 Budget for Finance Dept
2. Fiscal '93 Results Meeting
3. Staff Performance Reviews
4. Complete Data Center Move

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———> For Thursday, 24 December
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Industrial engineering and manufacturing

CAD/CAM industry copes with slow growth

By Maryfran Johnson
CAMBRIDGE, MASS.

These are unhappy times in the world of computer-aided design, manufacturing and engineering, and the infamous trio of fear, uncertainty and doubt was much in evidence recently at Daratech, Inc.'s CAD/CAM/CAE Strategy Workshops '93.

"There is great risk for users now and a lot of uncertainty and confusion about what to buy and about the future of what they have," said Charles Foundyller, president of Daratech, a market research firm. "There are no safe choices anymore."

In its 1993 forecasts for the CAD/CAM market, Daratech is projecting anemic growth of 2.2% this year — revenue of $8.1 billion over 1992's $7.9 billion. Growth forecasts for the top three market leaders — IBM, Intergraph Corp. and Computervision Corp. — were either flat or less than 2%. Among the top 10 hardware and software vendors, two were projected to grow at rates of 20% or more: Autodesk, Inc. (25%) and Structural Dynamics Research Corp. (20%).

As hardware becomes a short-term investment and users seek out software packages that can share data, many CAD/CAM suppliers are being reevaluated by their customers, Foundyller said. And the next generation of CAD/CAM software, he cautioned, will be largely incompatible with legacy systems.

Stand and deliver

One of the major concerns expressed during a user forum at the conference was the lack of attention being paid to the architectural and engineering market by major system and software vendors.

"Many of us really can't wait for some of these vendors who make promises and then don't deliver," said Sheldon Cousin, chief engineer of information technology at Stone & Webster Engineering Corp. in Boston. "Everybody is saying they can provide the capabilities we need," he added, "but the ones who seem to be fulfilling them are Intergraph and Autodesk."

Stone & Webster, a longtime user of IBM's mainframe-based Catia engineering and design software, recently completed a major power plant design project with a network of IBM RISC System/6000 Unix-based workstations running Catia.

In an industry dominated by IBM mainframes and Unix-based workstations, the rising number of CAD/CAM vendors lining up behind Microsoft Corp.'s Windows NT is another indicator that change is afoot.

"The momentum is with Windows and NT. It's the fundamental open system of the decade," declared James Meadlock, president and founder of Intergraph, which has adopted a dual strategy of offering customers a choice of either Unix or Windows NT. With its own growth stalled, Intergraph is counting on Windows NT to revive its fortunes on the technical desktop.

Out in front
With a projected share of 21.3% in 1993, IBM still leads the revenue race in the CAD/CAM/CAE market, Daratech figures show, but IBM is slipping with only 1.6% growth expected this year. Also stalled in '93 is Intergraph, with a 14.6% market share but virtually no growth expected, and Computervision, with 9.6% market share but zero growth anticipated. Vendors revving up the growth path this year include Autodesk, Cadence Design Systems, Hewlett-Packard and Structural Dynamics Research.

Among the Windows NT followers are companies such as Parametric Technology Corp. in Waltham, Mass. Currently a Wall Street darling because of its rapid growth in the mechanical design market, Parametric offers a single data structure for all applications and thus gives users a degree of integration previously unavailable.

Autodesk's *HyperChem does molecular modeling*

User-defined

"What [Parametric] has done is listen to users who are doing the design and then build their system around what users wanted," said Joseph Edlinger, an engineering specialist in the automation integration methods group at Bechtel Corp. in San Francisco.

"In the past, this industry's philosophy was that you can't really move users to new technology too rapidly because they'll be unable to absorb it," Foundyller said. Parametric "made it necessary to put new technology on the table now."

Another company determined to take command of wider terrain on the technical desktop is Autodesk, the market leader in PC CAD software with more than 788,000 seats installed. The Sausalito, Calif.-based vendor recently launched a new strategy emphasizing interoperable CAD products that can share data files among packages and across networks.

Industrial and manufacturing users have long clamored for a common underlying data model that would allow the wide variation of CAD/CAM development tools and software to interoperate, noted Ting Liu, a manager at Ford Motor Co.

Autodesk President and Chief Executive Officer Carol Bartz told the audience that vendors must leverage their own strengths by forming "virtual corporations" — short-term, cooperative alliances undertaken to accomplish specific projects for users.

Autodesk took part in such an operation to help build a 4.2 million-sq-ft shopping mall in Minnesota.

NetWare gets management relief with SNMP link

By Michele Dostert
SAN JOSE, CALIF.

Network managers at Novell, Inc. environments who are struggling to manage rapidly growing local-area networks with slowly growing support staffs will get some help from Network Computing, Inc.

The company has announced LANAlert SNMP Manager, a software product that lets users manage any Simple Network Management Protocol (SNMP)-compliant device — including PCs, Apple Computer, Inc. Macintoshes, routers, hubs, bridges, printers and power supplies — connected to a Novell NetWare LAN.

LANAlert SNMP Manager is the newest addition to the LANAlert family, which includes file server, node and remote LAN management products all integrated into a single management console interface.

LANAlert's user-definable exception-only features make it possible to manage large remote networks from a single location without the performance degradation associated with continuous polling, according to the vendor. Performance parameters can be defined for any SNMP device on the network in order to alert network managers of impending problems.

Rapid growth
According to Infonetics Research Corp. in San Jose, Calif., LAN segments are expected to grow 150% by 1995, but IS staff will increase only 10% in the same period.

No RISC

"The advantage of the LANAlert SNMP Manager is that people managing their Novell LANs from a NetWare server-centric view can get all the information SNMP can provide about their devices without having to invest in a RISC workstation and learning a whole new set of Unix-based management tools," said Mitch Kramer, an independent analyst in Sudbury, Mass. "It's integrated with products a lot of LAN managers already use."

The SNMP manager is unique because instead of requiring protocol stacks to be loaded

NetWare, *page 50*

Image-enabled NetWare

Novell has announced agreements with 12 imaging developers to build applications on Novell's upcoming NetWare Imaging Services for NetWare 4.0, which offers document and image management, mass storage and high-capacity storage services. Novell said the high-capacity storage services will ship with NetWare 4.0, while document, image and mass storage components will follow within three to six months.

Companies included in the announcement were Compulink Management Center, Inc., Excalibur Technologies Corp., Global Integrated Systems, Inc., Hewlett-Packard Co., Image Data Authoring Systems, Imagery, Inc., Kofax Image Products, Laser Data, Inc., Watermark Software, Inc., Westbrook Technologies, Inc. and Keyfile Corp.

Artisoft announces LANtastic 5.0

By Michele Dostert
TUCSON, ARIZ.

Artisoft, Inc. recently unveiled a new version of its peer-to-peer local-area network operating system, which is said to be easier to manage, more secure, more scalable and easier to connect to other networks.

LANtastic Version 5.0 will support 500 users per server, up from 300 in Version 4.1. New LAN administration features allow administrators to set up all user accounts on a single server, which then shares the information with other servers, the company said.

"This makes it a lot easier to set up and manage individual and group accounts because they are all stored in one place," said Kevin Cooper, data processing manager at Hecox, Horn and Wheeler, an accounting firm in Sherman Oaks, Calif.

He added that users need only to log on to one server to automatically access multiple server resources. Additional security features extending to the file level allow administrators to customize group and user access rights.

Jack Schoof, Artisoft's chairman and chief executive officer, has no delusions about LANtastic 5.0 taking over the corporate desktop.

"We're not trying to oust the NetWare server. We know that corporate IS will probably mandate it for mission-critical stuff," he said. "We just want to do the best networking for the workgroup and improve our interoperability with client/server environments like Unix and NetWare."

Put up a fight

While Artisoft may not be looking to gain share from Novell, Inc., the new product serves notice that Artisoft is unwilling to lose its peer-to-peer leadership to Johnnies-come-lately such as Microsoft Corp.'s Windows for Workgroups.

"LANtastic 4.1, which supports DOS, Macintosh and Windows clients, already had a considerable edge over [Windows for Workgroups] in networking functionality; 5.0 just raises the bar several notches higher," said Marty Palka, a senior analyst for networking at Dataquest, Inc., a San Jose, Calif., market research firm.

LANtastic users will now be able to bridge to OS/2 High Performance File System, write-once read-many devices and other non-DOS drives by setting up the connection as a LANtastic shared resource.

The new version also allows LANtastic users to bridge into Unix or NetWare environments by running Unix or NetWare client software on a LANtastic server, which can then give LANtastic users access to the NetWare or Unix server files.

Network Computing

CONTINUED FROM PAGE 49

on each designated management station, it uses the SPX/IPX and Apple Computer AppleTalk protocol stacks that Novell installs on each NetWare server. Using server protocol stacks means that the SNMP manager can be accessed from any DOS or Microsoft Corp. Windows PC on the LAN.

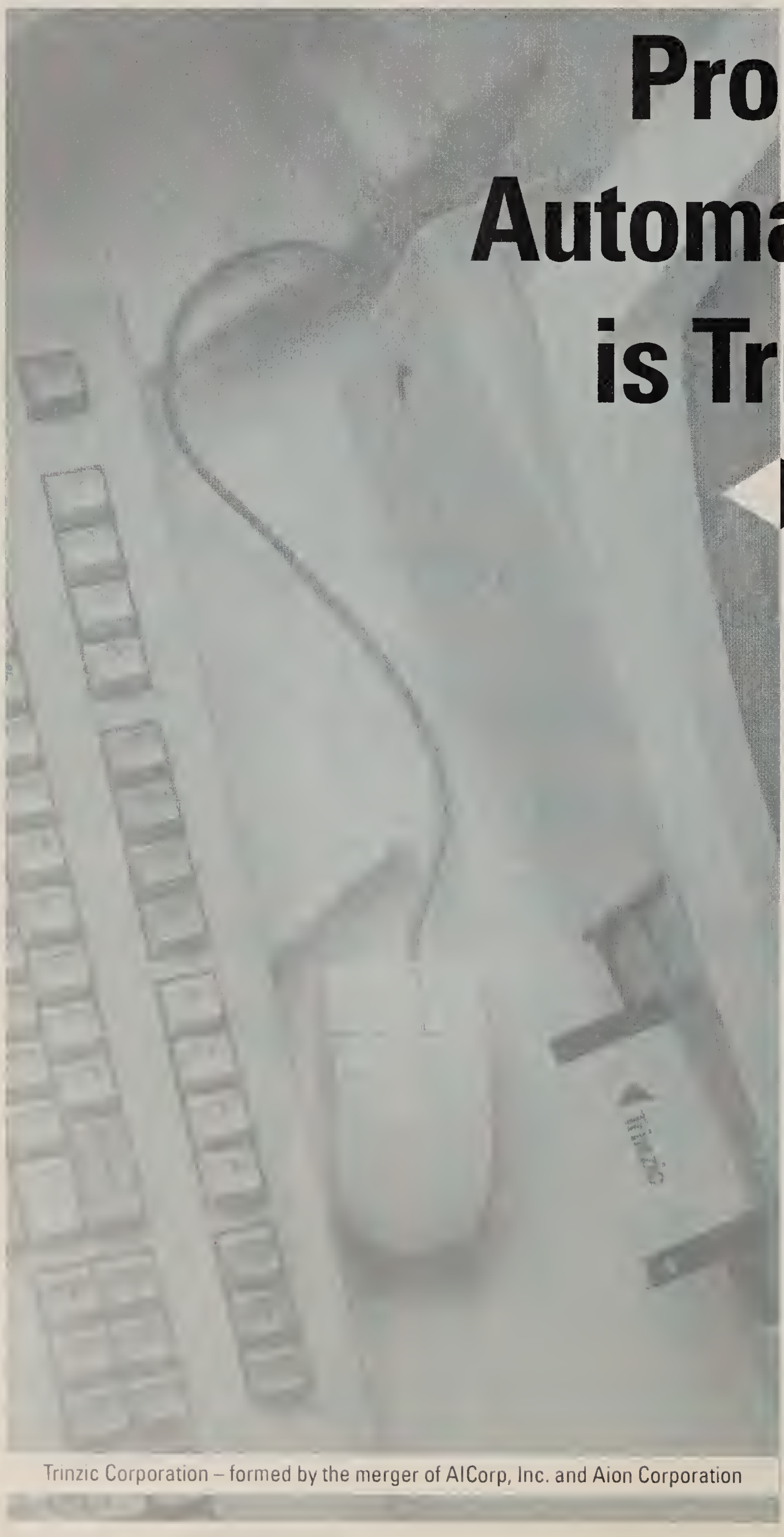
Priority list

Although Hewlett-Packard Co.'s OpenView and SunConnect's SunNet Manager are the leaders in SNMP-based management systems, they are not first on Network Computing's development to-do list, according to Darrell Evora, vice president of marketing.

"Our first priority is to integrate LANAlert with Novell's Network Management System," he said. "The Unix-based management systems will come later."

The SNMP manager, which operates as a NetWare Loadable Module on NetWare servers, has a built-in Management Information Base (MIB) compiler, allowing it to support vendor-specific MIBs as well as devices adhering to the MIB 1, MIB II or Remote Monitoring MIB standard.

LANAlert SNMP Manager is priced at $995 and is scheduled to ship by the end of the quarter.



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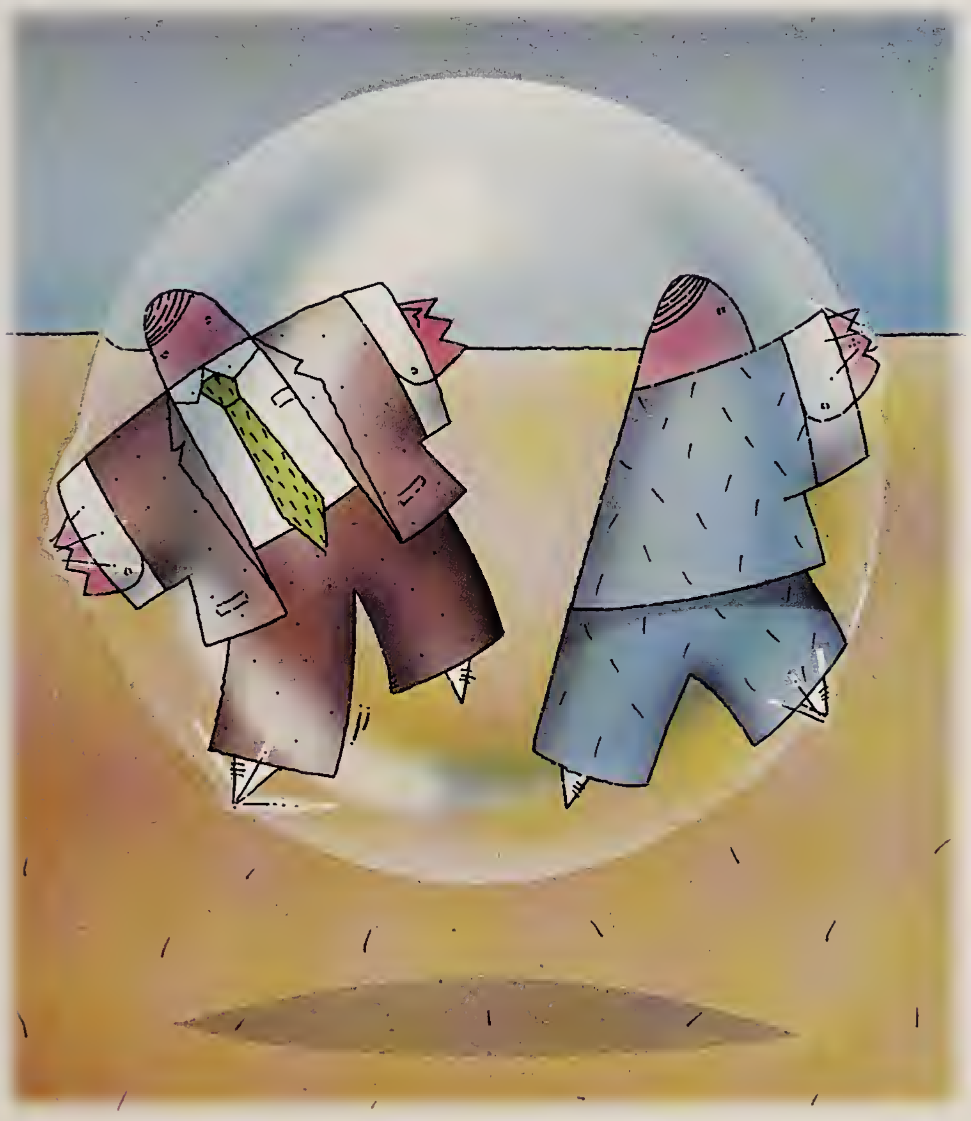

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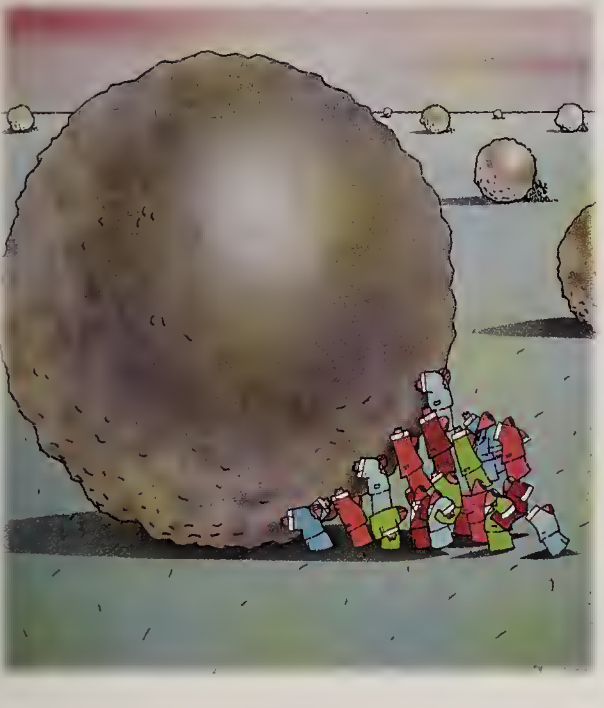

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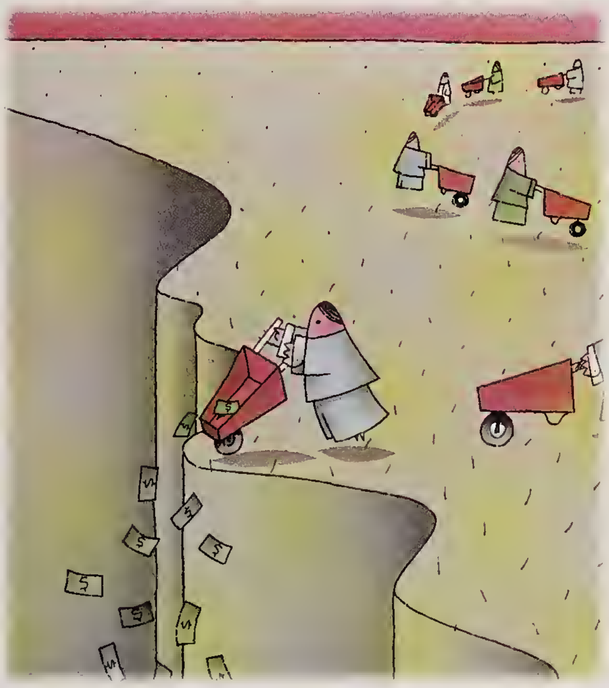

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Workflow Software: A Bright Light at the End of the Tunnel

BY SCOTT C. McCREADY

Workflow will be to the 1990s what re-engineering was to the late 1980s. It will only be a matter of time before you receive an FYI from your senior management with an attached airline magazine article. At that point you can begin to relax. At least the perceptory bombardment has past its peak. The bad news is if you haven't conquered workflow by then you will be behind the competitive eight ball.

There's a definite danger that workflow will be viewed as a panacea for all corporate ills. Obviously it is not. The question then becomes, what is it? Undoubtedly some folks will see it as simply another development environment to learn. Instead, we suggest that IS professionals should view workflow software as the best means to link business strategy to IS investments. In a general sense, workflow software is the ability to automate a wide-variety of business processes where exceptions to the process are handled equally as well as routine transactions. In the past, the accepted norm has been that unless one can reduce a process to an algorithm then it cannot be automated. Instead, corporations use tools to cope. Workflow software will turn that traditional theory on its end by allowing companies to automate business processes in a way that most never envisioned.

A TECHNICAL PERSPECTIVE

As a counter-balance to the ballyhooed future of workflow, an early fundamental technical explanation of what workflow is all about might be helpful. The technical underpinnings of workflow software are simple if you can think for a moment in terms of third and fourth generation languages.

In general, third generation languages (3GLs) consist of the following elements:

- Variables, arrays and the ability to combine them in using numbers and arithmetical operations;
- Statements which control the order in which operations are performed (flow of control and conditionals, DO/FOR loops, IF statements, etc.);
- Subroutine capability;
- Ability to store and access data on mass storage media using a file system;
- The capability to interact with an operator via a field or character-oriented statements such as DISPLAY and ACCEPT;

A fourth generation language (4GL), in turn, has all these elements plus the following:

- Instead of file operations, disk access is handled using a DBMS with a standard query language such as SQL;
- Instead of low-level screen interaction, 4GLs typically include an interactive, forms-based package for creating application screens with specified user interactions which tie the form to the application;
- Controlled or menu-based program definition and interpretive testing;
- Add to this a subroutine library for controlling specific devices, a program controlled cut-and-paste facility for exchanging information plus a subroutine library of tools for business modeling. (i.e. cases, queues and priorities) Then, mix well and you have the fundamental elements for a workflow software development environment.

This may sound relatively simple. How this is all packaged by the vendor for the user, however, has a significant impact on the resources needed to employ workflow software effectively.

CH..CH..CHANGES

For example, some vendors provide only the case management subroutine library. This library would be called from the 4GL of choice to build the workflow application. Alternatively, the vendor may provide an interactive macro facility for defining cut-and-paste operations which also manages retrieval and display of business information such as documents, scanned images, and faxes. Lastly, a vendor may provide a graphical way to represent the business process using users, work queues, and case types and the relationships that exist among them.

Now that we have a least a baseline technical description of what workflow software is all about, the challenge is to sort out the different vendor claims. At this early stage of the market, every vendor has their own definition of what workflow software is all about. In most cases, it is tempting for the vendors to take the easy way out and simply define workflow as the ability to route information from one person or desk to the next. Routing is the easy part!

The vast majority of effort in getting a workflow system up and running is not in defining the routing rules, rather it is defining and implementing the operations which must take place once a case (e.g. insurance claim, mortgage application) is being worked on at a user's desk. In general, this work has little to do with "workflow" as the user (claims adjuster, loan officer) thinks about it. This has much more to do with user interaction, forms, and procedural development.

FOUR TO ONE

Not to make workflow seem anymore of a challenge than it is, but the average IS shop will need at least three different kinds of workflow software. Furthermore, each of these three different workflow software environments will be designed on fundamentally different architectures. Add the normal complications of supporting a multi-vendor environment and it is easy to understand why workflow software despite its 4:1 productivity advantage over conventional C development may be passed over by some.

However, when IS personnel begin to get inundated with business and technical articles detailing dramatic improvements in both clerical and white collar business operations, it will become impossible for even die-hard C developers to ignore workflow software.

QUESTIONS ???

There is no question that workflow software will have a huge impact on business process automation. However, the risks of employing workflow software without adequate information are tremendous. On the flip-side, the risks of doing nothing are even greater. For more information on workflow software, the strengths and weaknesses of the major products, and to learn how users have successfully employed workflow, please plan to attend Workflow '93. For more information, call 1-800-343-4952.

McCready is a principal at IDC/Avante Technology, a market research firm in Framingham, Mass. The company recently completed a 1200 page report on workflow software entitled, "Workflow Software: The Challenge for the '90s."

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Workflow '93 will be held in conjunction with LotusWorld '93.
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New Products

Workgroup software applications

Carnegie Group, Inc. has introduced the NameFinder.

According to the company, the product finds occurrences of names and their variations in real time and historical online text. Written in C language, NameFinder has built-in knowledge of the manner in which names are structured. The variability of factors, including forenames, titles, abbreviations, tag words and case sensitivity, is recognized.

The product is available on the Unix platform, including Hewlett-Packard Co., Sun Microsystems, Inc. and Digital Equipment Corp.'s DECstation.

A source-code site license costs $60,000.

▶*Carnegie Group*
5 PPG Place
Pittsburgh, Pa. 15222
(412) 642-6900

Unix

UniSolutions Associates has released Version 2.1 of Unisol Job Accounting for Unix.

Users can define their own default project, and the disk accounting can perform accounting only for local file systems and can disregard Network File System-mounted directories, according to the company.

New ports include Sunsoft, Inc.'s Solaris 2.1 operating system and Unix System V, Release 4.

License fees for single machines range from $1,600 to $5,500.

▶*UniSolutions*
Suite 1
2103 Matthews Ave.
Redondo Beach, Calif. 90278
(310) 542-0068

In Brief

Build your own SPARC

Adopting a PC market model for the Unix world, **Integrix, Inc.** in Newbury Park, Calif., announced its "build your own" Scalable Processor Architecture workstation program for OEMs, value-added resellers and system integrators. The new program offers third-party vendors the option to private-label systems by integrating Integrix motherboards, enclosures or complete workstations in their own configurations.

Sun, Sybase make a deal

Sun Microsystems, Inc. and **Sybase, Inc.** last week joined forces in a deal that provides Sun with an enterprisewide license for Sybase's GainMomentum application development environment.

Sun said it will use GainMomentum tools to develop a new generation of software that takes best advantage of the built-in multimedia features of Sun SPARCstations and SPARCservers. Sun has been using GainMomentum tools for its own client/server network applications, said William Raduchel, chief information officer at Sun.

Sun has also used GainMomentum tools for SunTutor, an interactive training application for first-time SPARCstation users that began shipping in August 1992. GainMomentum is intended for building large-scale client/server applications in less time than those built with languages such as C or C++. It uses a suite of multimedia editors, an integrated object-oriented database and a fourth-generation language.

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Update Options

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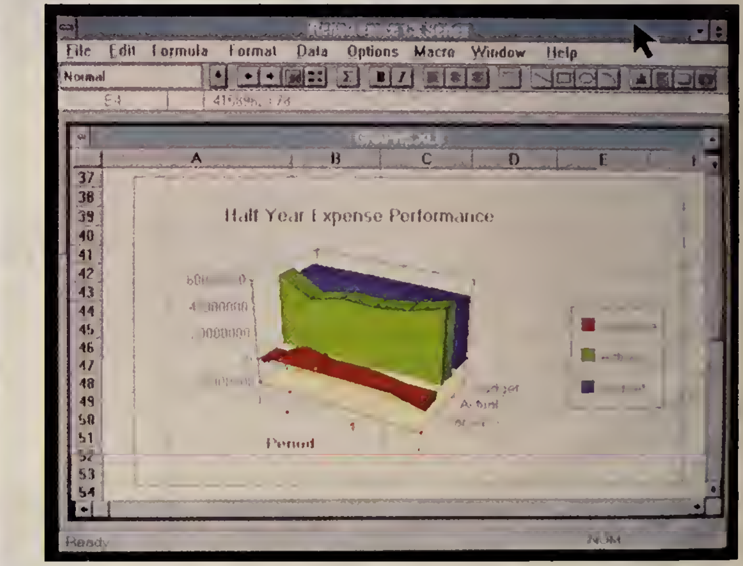

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New Products

Applications

Beyond, Inc. has announced BeyondMail Forms Designer 2.0, a Microsoft Corp. Windows-based tool.

The product allows users to create custom forms for BeyondMail. Compatible with BeyondMail for Windows and BeyondMail for DOS, Forms Designer 2.0 has "rule buttons" that automatically trigger work flows such as database transactions, customized form data input and intelligent form routing, according to the company.

Display bit maps for incorporating graphics or company logos into forms and sample templates with forms for conference call notices, travel and vacation requests and purchase requisitions are also provided.

Forms Designer 2.0 costs $995.

▶ *Beyond*
38 Sidney St.
Cambridge, Mass. 02139
(617) 621-0095

Digital Equipment Corp. has introduced DEC MediaImpact multimedia software.

The product was designed for DEC's Unix workstations. The DEC MediaImpact Runtime Kit v1.0 provides computer-based training, multimedia presentations and information kiosk systems.

A what-you-see-is-what-you-get graphical editor and a palette of Open Software Foundation/Motif-based authoring tools are included in the DEC MediaImpact Authoring Kit v1.0, enabling both technical and nontechnical users to build complete multimedia applications in a graphical fashion.

The Runtime Kit costs $350, and the Authoring Kit costs $3,530.

▶ *DEC*
146 Main St.
Maynard, Mass. 01754
(508) 493-5111

Electronic mail

Powercore International, Inc. has started shipping WinMail 1.5, an electronic-mail application.

According to the company, full integration with Novell, Inc.'s NetWare is provided. The product is said to be the first major E-mail package incorporating a DOS client that is mouse- and keystroke-compatible with the Microsoft Corp. Windows-based version.

WinMail 1.5 was designed as a Dynamic Link Library and offers more than 160 message gateways that can be used to send and receive mail because the most recent Novell Message Handling System is supported.

A five-user package costs $495, a 25-user package costs $1,395, and a 100-user package costs $3,995.

▶ *Powercore International*
1 Diversatech Drive
Manteno, Ill. 60950
(815) 468-3737

Storage

Storage Technology Corp. has introduced NearNet, a network storage manager. The product simplifies the management of data located on networks of servers and workstations that are using the Unix operating system.

Direct support is provided for a variety of systems, including those from Sun Microsystems, Inc., Silicon Graphics, Inc., Hewlett-Packard Co., Intergraph Corp. and IBM. The NearNet system can also back up files from other networked systems via the Sun Network File System.

The cost of an average configuration is approximately $200,000.

▶ *Storage Tek*
2270 South 88th St.
Louisville, Colo. 80028
(303) 673-5151

Workstations

Apogee Systems, Inc. has launched Orbiter II+, a 50-MHz Scalable Processor Architecture workstation.

Orbitter II+ features 32M bytes of memory, a 424M-byte hard disk, a GX graphics accelerator and a 19-in. color monitor, the company said. The product works with Sun Microsystems, Inc.'s Solaris 1.0.X software.

Orbiter II+ costs $11,295.

▶ *Apogee Systems*
1815 S. Gadsden St.
Tallahassee, Fla. 32301
(904) 561-5051

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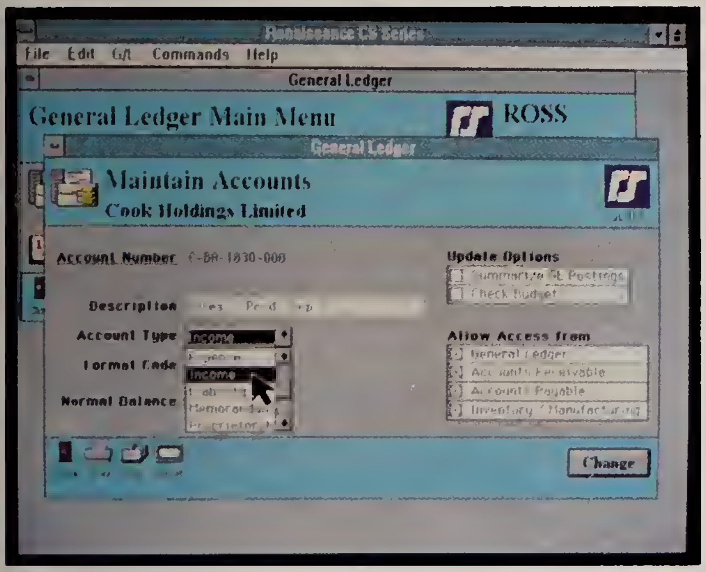
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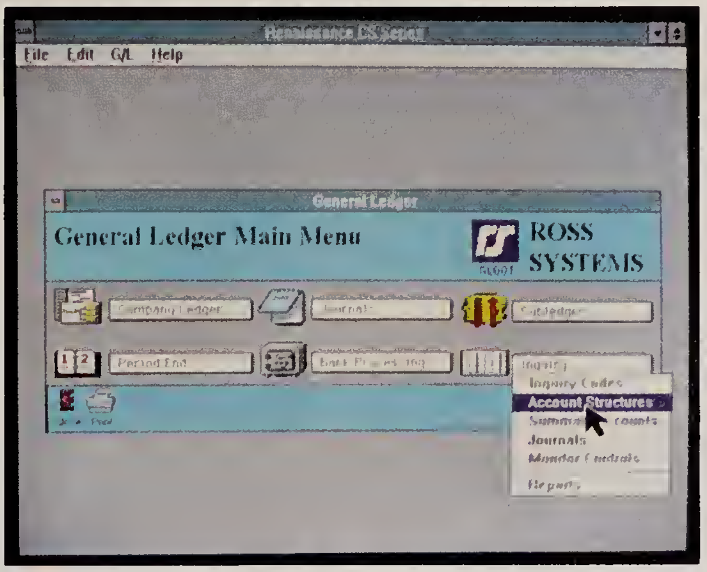
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cus·tom·er·ize \ kūs'-tə-mə-rīze' \ *vt* **1:** to make a company more responsive to its customers and better able to attract new ones **2:** to customerize an organization's information strategy, e.g., to extend systems capabilities to field locations and other points of customer contact and support **3:** what Unisys Corporation does for a growing roster of companies, and government agencies, worldwide ***syn*** see CUSTOMER SERVICE, COMPETITIVE EDGE, BUSINESS-CRITICAL SOLUTIONS, REVENUE GENERATION

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LAN-to-LAN connection

Fisher-Price fields grown-up network

Toy maker installing links to improve manufacturing and distribution

By Thomas Hoffman
EAST AURORA, N.Y.

Fisher-Price, Inc. is in the midst of installing a global network that could hardly be called child's play. The $700 million toy maker expects the new network to help the firm better coordinate its manufacturing and distribution requirements while providing long-term cost savings.

Earlier this month, Fisher-Price installed LAN-to-LAN connections between its manufacturing and distribution sites in Peterlee, UK, and Hong Kong and its East Aurora headquarters, according to Jim Carrier, director of computer technical services. Carrier said Fisher-Price is standardizing on Novell, Inc.'s NetWare v3.11 network operating system with Cabletron Systems, Inc. smart hubs on 15 Ethernet local-area networks running Transmission Control Protocol/Internet Protocol and IPX.

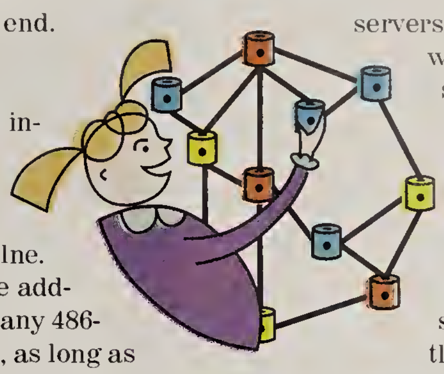
Prior to the networking overhaul, Fisher-Price used remote intelligent processors to link CRTs and printers in the field to a Unisys Corp. A17 mainframe computer over leased lines. Fisher-Price is now installing LANs in eight North American manufacturing and distribution sites, with plans to connect all of those over a wide-area network by year's end.

That's not all

Fisher-Price is also in the process of replacing a Control Data Corp. 860A mainframe used to run computer-aided design and manufacturing applications. The mainframe is being replaced with a network of 50 Hewlett-Packard Co. Series 700 workstations.

486 connection

Carrier said Fisher-Price has installed four of six Intel Corp. I486-based 50-MHz servers at its headquarters. The company uses DTK Computer, Inc. PCs, Carrier said. However, he added that the toy maker will use any 486-based PCs with the best value, as long as replacement parts are interchangeable.



The WAN was designed to provide Fisher-Price employees improved access to the company's Unisys A17 mainframe, which handles the bulk of the firm's processing, Carrier said. However, Carrier added that Fisher-Price's move to open systems will eventually make the Unisys mainframe obsolete. The company is replacing its proprietary Unisys equipment with Hewlett-Packard Co.'s Unix-based machines, with an eye toward improved processing and increased interoperability, Carrier said.

Although Fisher-Price recently added electronic data interchange, master planning and market research applications to its two HP servers, Carrier said the company will make the switch to open systems a gradual move.

"We intend to do that very slowly over a long period of time," said Carrier, who added that Fisher-Price intends to replace its A17 mainframe with a smaller A series model within the next three years.

In July 1991, Fisher-Price became an independent, publicly traded firm following its spin-off from The Quaker Oats Co. However, Carrier said, the company's independence had little bearing on its move to open systems. "I think we would have done this anyway. IS operations were always handled independent from Quaker Oats," Carrier said.

Commentary

Joanie M. Wexler

AT&T: Feigned altruism?

I could be generous and simply describe the altruistic air AT&T has assumed in filing a recent lawsuit against its competitors as inconsistent. But "borderline hypocritical" would really be more accurate.

AT&T's suit seeks back damages for business grabbed by MCI, Sprint and WilTel when the FCC required only AT&T — then considered a "dominant" carrier — to file tariffs on basic network services while the other phone companies cut all the clandestine deals they wanted. This has long been a situation AT&T and others have deemed unfair and one that a U.S. district court reversed with a ruling in November.

So it would appear that AT&T is on the mark with the intent of its lawsuit — despite the motion Sprint recently filed in U.S. District Court to dismiss the suit because it smacks of being a "marketing ploy."

While I don't agree with Sprint, I do find it annoying that AT&T is trying to capitalize on the situation by positioning its latest legal action

Wexler, *page 64*

Systems Center adopts LAN focus

By Elisabeth Horwitt
RESTON, VA.

Just like its archrival IBM, Systems Center, Inc. is moving its network and systems management products down to local-area networks so it can continue to manage customers' environments even as they downsize.

"We're moving from mainframe-centric to distributed client/server systems," said John Daily, Systems Center's recently appointed chief executive officer. The company has already laid the groundwork for this move: A year ago it announced Solve:LAN, a group of change, problem and configuration management applications for LAN-based systems.

More recently, Systems Center acquired sole marketing rights to Tangram Systems Corp.'s AM:PM product for updating distributed LAN workstation software. However, both sets of applications are still mainframe-centric, with the Solve:LAN applications running under Systems Center's mainframe-based systems management platform, Net/Master, Daily pointed out.

Later this year, however, Systems Center plans to release Advance Systems Management (ASM), an object-oriented, client/server-based version of Solve: LAN, Daily said.

ASM will give users a choice of running their distributed systems management applications on the mainframe, a client/server LAN platform or a combination of the two, Daily added.

New additions

The company also plans to provide the new platform with new applications, such as asset management and help desk management for LANs, Daily said.

"Systems Center's strategy is to go from a NetView clone to an application solution provider," said Jeremy Frank, vice president of networked systems management at Stamford, Conn., research firm Gartner Group, Inc.

While the vendor has "made some great strides" in that direction, "it's an unpaved rocky road, [going from] the mainframe world to a distributed strategy," he added. The biggest challenge may be dealing with very different sales channels and reorienting "huge staffs of procedure-based programmers" to LAN-based systems, Frank said.

Systems Center is still banking, however, on users choosing to keep their mainframes around as system and network management focal points for many years to come, Daily said. While LAN servers will handle the graphical user interface and some processing, the bulk of applications will reside on the mainframe, he added.

Indeed, Systems Center hopes to attract users and application vendors by offering an easy link between LAN-based management applications and the mainframe network management environment, Daily said.

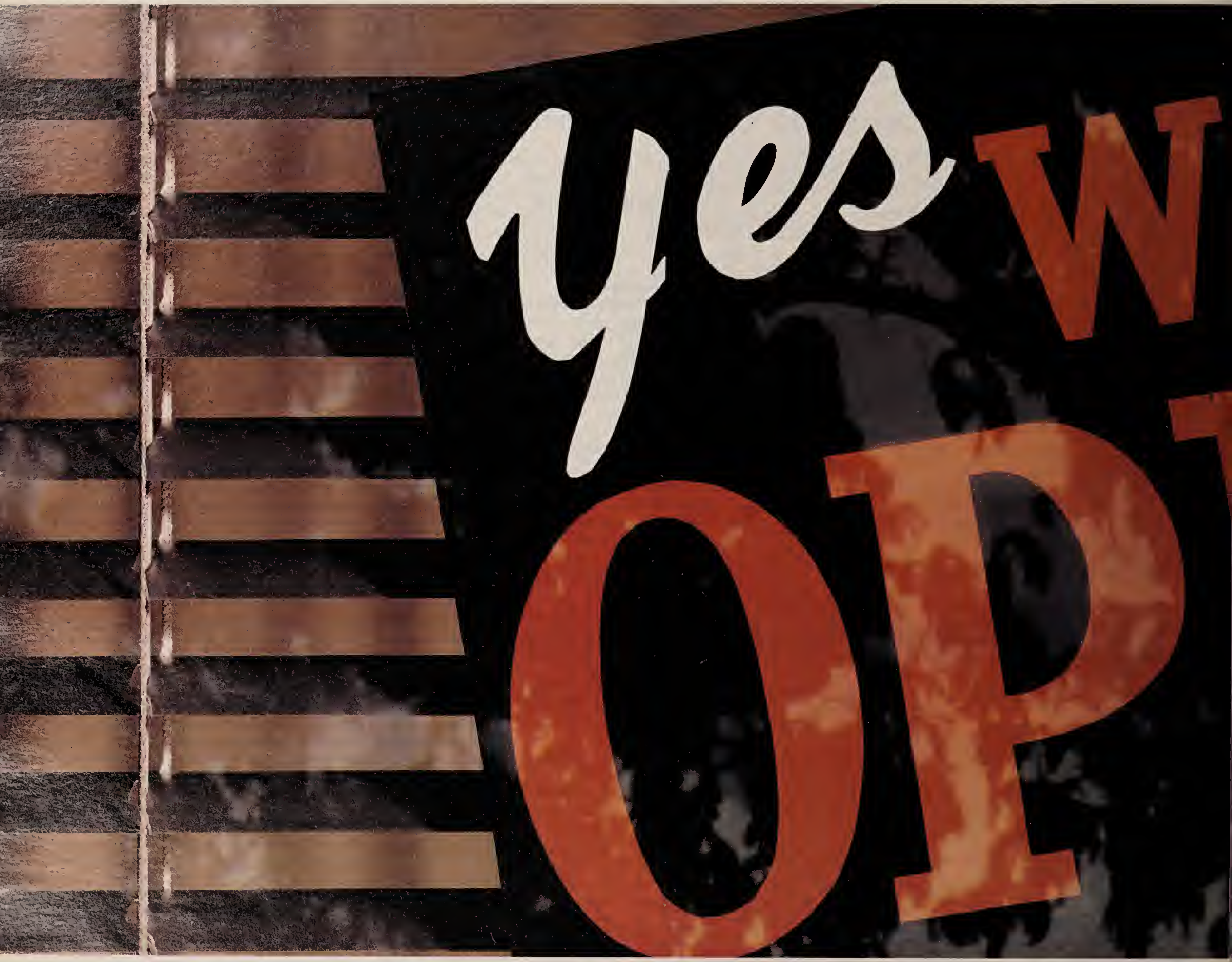
Systems Center plans to integrate its Solve:LAN platform with popular LAN management systems such as Novell, Inc.'s NetWare Management System, IBM's NetView/6000 and Hewlett-Packard Co.'s OpenView, Daily said. Solve:LAN will support the Simple Network Management Protocol standard by midyear, he added.

Systems Center is considering the Open Software Foundation's Distributed Management Environment as a standardized platform for its distributed management system, Daily said.

SNA

Systems Center is moving away from its SNA roots but is not severing its ties to the IBM mainframe world. "SNA may be regarded as a dinosaur by many in the industry, but I believe strongly that it will still be important 15 years from now," said Robert E. Cook, chairman of Systems Center.

Sign of the times.



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Competing modem standards confuse

By Lynda Radosevich

Two opposing vendor camps are doing their best to confuse customers looking at new, high-speed modem technology. Each delivers or promises to deliver proprietary modems that run faster than the current 14.4K bit/sec. maximum allowed by the CCITT V.32bis standard.

Both camps are targeting customers who need faster transfer rates for remote local-area network access, file transfers and other high-speed applications and who cannot wait for products based on the upcoming V.fast standard.

Analysts estimated the V.fast standard, which will deliver data transfer rates of up to 28.8K bit/sec., will be completed by the end of first quarter 1994, but products that comply with a "stabilized" standard are expected by December.

Now, 18 companies, led by AT&T Microelectronics, said they will offer modems based on a nonstandardized scheme that will deliver maximum data rates of 19.2K bit/sec. AT&T said it will ship chips for the V.32terbo technology to manufacturers this month. V.32terbo-based products are expected to ship in late spring.

Meanwhile, companies including Microcom, Inc. in Norwood, Mass., Motorola Codex in Mansfield, Mass., Racal-Datacom, Inc. in Sunrise, Fla., and U.S Robotics, Inc. in Skokie, Ill., already ship proprietary versions of V.fast technology that they said will be upgradable to V.fast when the standard is completed. General Datacom, Inc. in Middlebury, Conn., plans to ship prestandard V.fast products in June.

"V.fast timing got pushed back and vendors got edgy about putting together a faster modem," said Janet Fugazzoto, senior market analyst at BIS Strategic Decisions in Norwell, Mass.

18 companies, led by AT&T Microelectronics, said they will offer modems based on a nonstandardized scheme that will deliver maximum data rates of 19.2K bit/sec.

However, 60 vendors representing 75% of worldwide production publicly rejected V.32terbo and expressed support for the upcoming V.fast standard. AT&T said it also supports the V.fast standard.

In a joint statement, the companies said that "the V.32terbo solution stretches the capabilities of V.32 beyond its design limits." V.32terbo vendors lost a bid to the Consultative Committee International for Telegraphy and Telephony (CCITT) for standardization.

Confusing the consumers

The above vendors and analysts agreed that faster, standardized V.fast products will be available so soon after the proprietary V.32terbo products that consumers may be confused and may unknowingly invest in the slower, nonstandard technology.

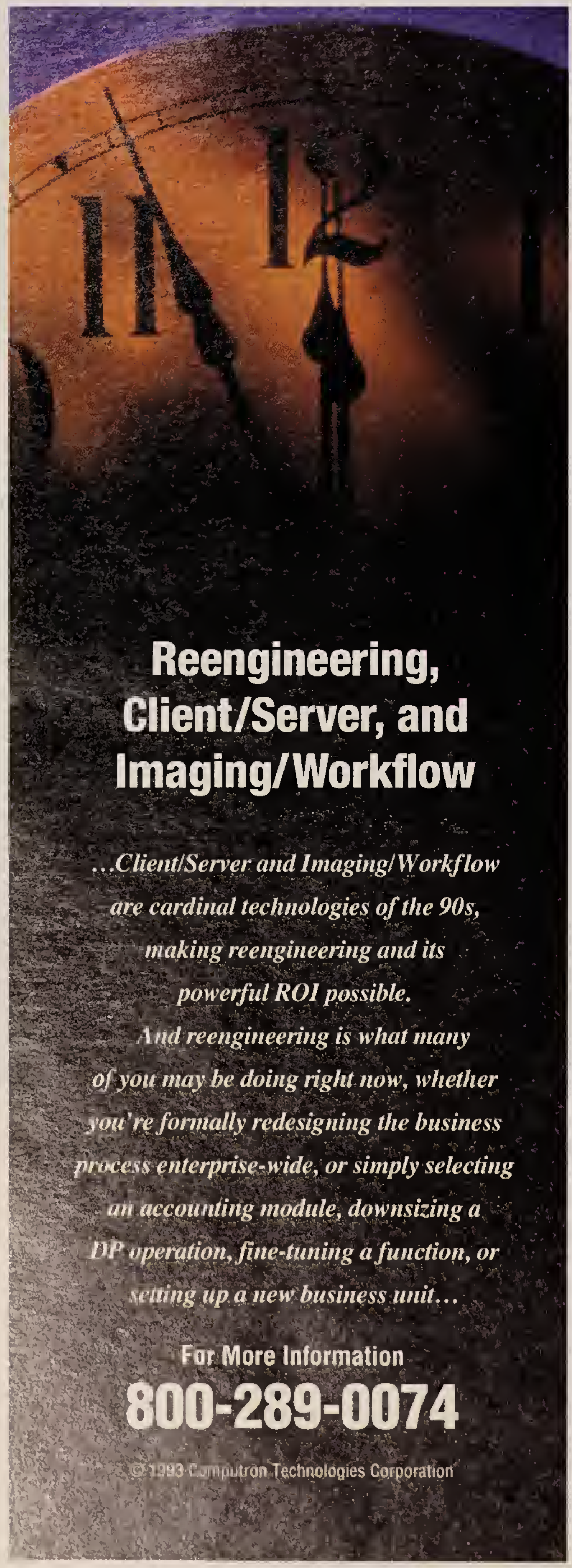
When the V.fast standard is completed, "everyone will say, 'What was terbo?' " said Lynda Fitzpatrick, market research analyst at International Data Corp.

Blanchard Hiatt, a spokesman at AT&T Microelectronics, the chip-making division of AT&T, said he thinks the V.fast standard will not be settled until well into 1994 and that it is easy to extend the current V.32bis standard to higher data rates. Because it is based on the current standard, "V.32terbo design problems for modem makers are nonexistent."

That means V.32terbo products will be delivered sooner and will cost less, said Scott Porter, vice president of sales at Zypcom, Inc. in Hayward, Calif. Zypcom will ship a V.32terbo modem in May for $749 and will ship new V.fast units to the same customers for $299 when the standard is complete, he said.

Proprietary V.fast schemes are no panacea. Priced between $1,200 for a 16.8K bit/sec. data rate and $1,695 for a 21.6K bit/sec. data rate, most will require customers to change processor hardware and will have a roughly $300 upgrade fee.

For BT North America, Inc., a value-added network service provider in San Jose, Calif., the answer is to wait for faster modems based on a completely V.fast standard.



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Proteon eyes backbone router market

By Joanie M. Wexler
WESTBORO, MASS.

Proteon, Inc. staked its claim in the industrial-strength router market last week with the CNX 600, an initiative to the vendor's internetworking family that is aimed at the high-end headquarters internetworking arena.

The CNX 600, slated to ship next month for approximately $22,500, is Proteon's vehicle for providing the large number of local-area network connections and high throughput that users need when accommodating volumes of distributed internetwork traffic through central sites.

Proteon rival Cisco Systems, Inc. recently introduced Cisco 7000 [CW, Jan. 18] as a competitive answer to backbone-oriented internetworking devices from Wellfleet Communications, Inc. and Coral Network Corp.

The CNX 600 has an asymmetrical design, as does Cisco's product. With the exception of Wellfleet, most vendors employ such a design, in which attached LANs contend for some centralized processor resources, which could limit the design's scalability as networks grow.

Proteon will provide the option of adding a second Advanced Micro Devices, Inc. 29030 reduced instruction set computing processor. This will boost Proteon-measured performance from 50,000 to 100,000 packets per second, said Richard Lush, Proteon's director of internetworking product marketing. He said the performance numbers apply to all 17 protocols supported by the CNX 600.

Proteon also announced the Network Management Extender (NME), a $10,000 to $12,000 complementary unit to the vendor's Series 90 wiring hub. The NME, scheduled to ship in June, collectively manages hubs, Token Rings and Ethernets from one platform.

Announcements at Interop mix SNA, LAN protocols

By Elisabeth Horwitt

Users seeking ways to integrate Transmission Control Protocol/Internet Protocol (TCP/IP) and IBM's Systems Network Architecture (SNA) traffic over the same network backbone will find options at this week's Interop '93 Spring show.

IBM is expected to announce the first products based on MultiProtocol Transport Network (MPTN), which is said to enable TCP/IP Sockets applications to communicate over an SNA backbone, and vice versa, via an OS/2 server. In addition, IBM will announce additional third parties — including Oracle Corp. — that have committed to supporting MPTN.

The Advanced Peer-to-Peer Interconnection Forum will have its second meeting at Interop and will announce five new voting members. Eicon Technology Corp. is expected to announce the InterConnect Server, a combination local-area network gateway and router that will support TCP/IP traffic over an SNA backbone, as well as TCP/IP and other LAN protocols over SNA.

The initial InterConnect Server release is a Novell, Inc. NetWare Loadable Module, with OS/2, Unix and Microsoft Corp. Windows NT versions to come.

Priced between $3,000 and $5,000, InterConnect Server will route popular LAN protocols and will support X.25, frame relay and Integrated Services Digital Network links, according to Eicon.

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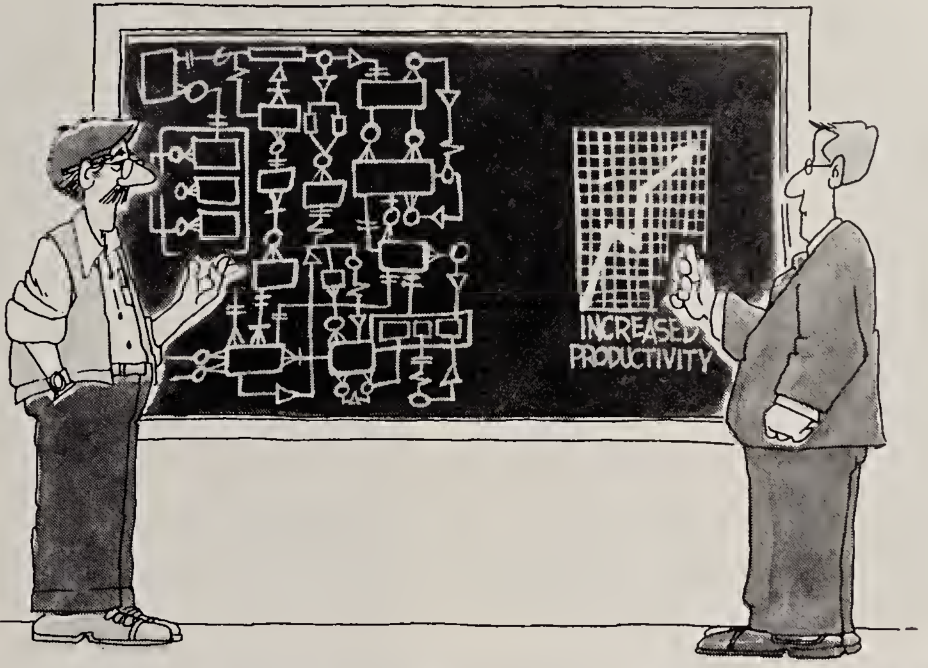

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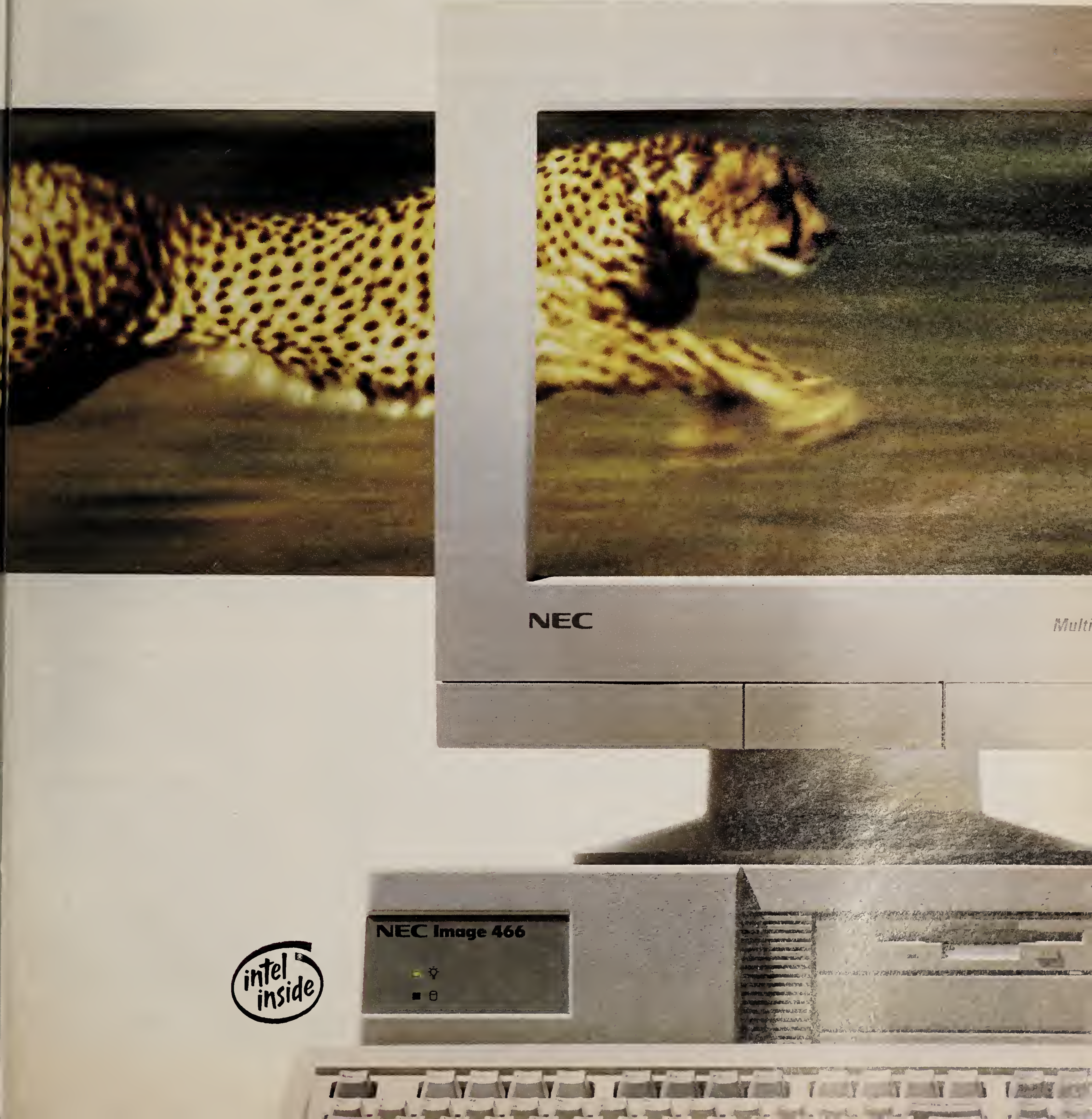
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intel inside

Standards development

Rivals team up for EDI

By Gary H. Anthes

Freddie, Fannie and Ginnie — they sound like the names of genial children playing in a sandbox. But the huge companies bearing those nicknames are among the fiercest of competitors as they fight to boost their shares of an $825 billion market.

But now, the Federal Home Loan Mortgage Corp. (Freddie Mac), the Federal National Mortgage Association (Fannie Mae) and the Government National Mortgage Association (Ginnie Mae) have set aside parochial interests in order to collaborate on a project to standardize the flows of data in the mortgage industry.

They said the benefits will touch all sectors of the industry, including borrowers, lenders, mortgage service providers and even Wall Street firms.

Cash flow

Freddie Mac and Fannie Mae are congressionally chartered, publicly held corporations established to ensure a flow of funds from the capital markets to mortgage lenders. They buy mortgages from banks and savings institutions, group them into pools and sell shares in the pools as mortgage-backed securities on Wall Street.

Ginnie Mae has the same mission but is part of the federal government under the U.S. Department of Housing and Urban Development. Last year, Freddie, Fannie and Ginnie bought mortgages worth $534 billion.

The three agencies have teamed with the Mortgage Bankers Association of America (MBA) to develop standards for electronic data interchange (EDI) related to the creation, servicing and selling of these mortgages. The goal is to make it easier, faster and cheaper to get information from lenders — who typically maintain three sets of interface systems, one each for Freddie, Fannie and Ginnie — and to make it feasible to get more data for better management of their operations.

Kings of the hill

Four out of five residential mortgages originated each year in the U.S. are subsequently purchased by three government-chartered corporations, which now hold $1 trillion in outstanding loans.

Numerous parties are involved in a mortgage from its origination, closing, monthly servicing, possible sale and eventual payoff (see chart). A considerable volume of paper submitted by home buyers when applying for mortgages triggers a flood of data in the form of credit reports, employment verifications, appraisals, title searches and the like.

"The whole industry exists to exchange information," said Mark Fleming, operations vice president at Freddie Mac in Vienna, Va. "That's our business; we don't produce anything except information."

Unfortunately, much of that information remains on paper, and the intercompany electronic interfaces that do exist must be built on a custom basis for each party because of the lack of standards. "Loan origination is very paper-intensive," said David Barkley, director of EDI customer service at Freddie Mac. "Those guys are ecstatic if a credit report is faxed."

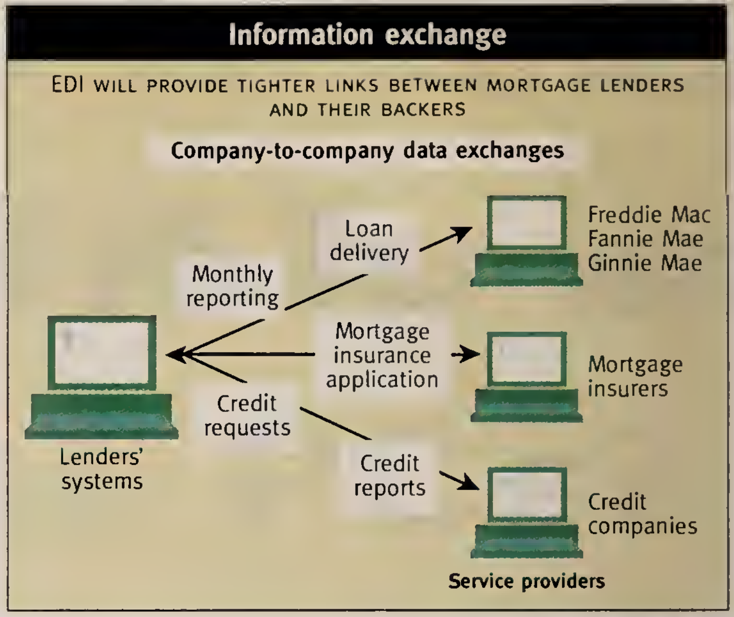
Transaction approval

Freddie, Fannie, Ginnie and the MBA have established a Lending Task Group under the X12 Finance Committee of the American National Standards Institute, where they are working to develop a set of standards for EDI. The mortgage industry has now received X12 approval for the first three of a dozen or so mortgage transaction sets, and implementation has begun at some lender sites.

Officials at Freddie Mac said they are just beginning to do a cost/benefit analysis for the project. However, recent industry surveys said banks and other lenders may be able to trim the costs of dealing with the three agencies by 40% as a result of the EDI standards.

While lenders should see their lives greatly simplified as a result of EDI, there is a troubling side for the three agencies, Fleming said.

"In the past, we could add or change data whenever we wanted to without getting permission or having to conform to dates or definitions. Now, we'll have to anticipate needs and changes much further in advance. That's a little scary; it's an internal challenge."



Source: Freddie Mac

CW Chart: Michael Siggins

Building steam

The mortgage industry's EDI project has a bit more behind it than automating and standardizing data flows. It will greatly increase the amount of information that now accompanies the loans that Fannie Mae, Freddie Mac and Ginnie Mae buy from lenders.

Currently the three agencies get summaries of the loan data, but an official at Freddie Mac said that in the first phase of the EDI project alone, the number of data elements per loan will jump from 30 to 114.

The extra data bears on the credit-worthiness of borrowers and the characteristics of their properties — from details on loan applications, credit reports and appraisals.

"Sooner or later we knew the information was going to be asked for," said Brian Hershkowitz, associate director at the Mortgage Bankers Association of America, which represents 2,600 firms that originate, sell or service mortgages. "Whoever owns the loan is entitled to this information."

Freddie Mac, Fannie Mae and Ginnie Mae hope to develop artificial intelligence systems that will allow them to use this extra data to do a better and faster job of evaluating mortgages. The data-hungry AI programs would not be practical without EDI, said Mark Fleming, operations vice president at Freddie Mac.

Wexler

CONTINUED FROM PAGE 57

as a magnanimous attempt to play guardian of the cost-lowering effects of competition. Consider, for example, the following AT&T PR schmooze-ola:

"When all long-distance companies file their rates publicly, customers can know the service offers available and make choices that best suit their business needs. Secret deals deny customers the advantages of competition."

Quote, unquote, AT&T Business Communications Services President Joseph P. Nacchio.

Actions louder than words

I happen to agree with Nacchio. But if he really means this, why, in the case of services such as frame relay and other enhanced network services, does AT&T turn around and protect its price lists like a lioness with newborn cubs?

AT&T's openhearted philosophy of tell-all pricing's being good for the user does a complete about-face in the case of enhanced services — when the law says it's OK to keep the information mum. Not only does AT&T not make its enhanced service price lists public, it requires customers for whom it prices out networks to sign nondisclosures.

In fact, a recent *Computerworld*-chaired conference session at ComNet '93 in Washington, D.C., almost didn't happen because AT&T wouldn't open its kimono and price out on a component-by-component basis a mock frame-relay request for proposal that other carriers, including WilTel and MCI, readily responded to.

Understandably, the other carriers weren't thrilled to lay all their competitive cards on the table for AT&T to inspect without AT&T's returning the favor. Let's face it: AT&T is the most close-mouthed carrier in the industry when it comes to pricing.

AT&T explains away its polar approaches as simply a result of today's inconsistent telecommunications laws — and it does have a point there.

The Communications Act of 1934 requires all carriers to tariff basic network services but issues no such mandates about enhanced services — services in which anything is done to user data by the carrier above and beyond basic transport.

Fair play?

So if it's all perfectly legal, as a business with an almighty bottom line, you gotta do what you gotta do.

But I think it's a cheap shot to try to leverage the situation to make yourself look like a consumer advocate when all you're really trying to do is gain every buck you can in today's cutthroat telecommunications business.

As a side note, it seems incongruous to me that tariffing basic telephone transport service rates encourages competition while the enhanced service business is deemed healthier if prices are kept hush-hush. I'm sure, though, that there's an economist somewhere surrounded by spreadsheets that prove it to be true, or this wouldn't be the law, right?

It's not that I'm advocating that carriers tariff every service they offer — not by a long shot. Tariffs stall deployment and are too verbose for most of the human race to understand anyway. Probably most importantly, they also limit user negotiating power.

But I do think a carrier should be willing to stand up and say what it will charge, say, for a 56K bit/sec. frame-relay link between Kansas City and San Francisco when someone asks. I don't see how such forthrightness could be detrimental to the user community. Do you?

Wexler is a *Computerworld* senior editor, networking.

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SOFTWARE
CORPORATE STRATEGIES

Large Systems

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Client/server DBMS

Walk, don't run, with it

By Johanna Ambrosio

■ As many large user organizations take their first tentative steps toward the brave new world of the client/server database, users are likening the scenario to that of two people who do not speak the same language trying to describe to one another the inner workings of a lawn sprinkler.

"In the DB2 environment, I'm used to security, disaster recovery and the high availability necessary for production systems," said David Beulke, DB2 database administration manager at Spiegel, Inc. in Westmont, Ill. "But the PC mentality is a whole different ball game. The standards and procedures in place on the mainframe are nonexistent on the PC."

closer LOOK
DBMS

Walter Viali, manager of the Information Systems Enabling Center at Texaco, Inc. in Houston, seconded Beulke's comments. "One of our biggest problems is that we're looking for a set of tools to limit the retraining required. A lot of the mainframe expertise is not easily applicable to client/server."

Other key issues outlined by some database consultants include the following:

- How to bring together the technical know-how required on all fronts.
- Which standards to adhere to, if any.
- The advantages and disadvantages of using "middleware" vs. directly connecting the mainframe to the PC network.

Because of these challenges, many companies find that the easiest and most logical path to client/server database applications is to walk, not run, and to build onto the existing infrastructure step by step.

Case in point

Baxter Healthcare Corp. in Deerfield, Ill., is taking that route. There, the first widespread database application uses Sybase, Inc.'s Microsoft SQL Server under OS/2 on a Token Ring local-area network with Microsoft Corp. Windows-based workstations. Although there is no interaction with the mainframe, it is this basic infrastructure on which Baxter is building its client/server applications.

The first true client/server database application, being developed now, uses SQL Server under Microsoft's Windows NT with Windows clients. The database is "synchronized with a master set on the mainframe," explained Michael Purcell, a software engineer at Baxter. The synchronization, via an existing Systems Network Architecture gateway provided by Microsoft under OS/2, is between the SQL Server and IBM's DB2 on the mainframe. This application will be beta-tested this summer, he said.

A key component of Baxter's client/server architecture will be remote network and systems management tools with the "ability to see and manage all the way down to the workstation," Purcell said. "The hard part is rethinking and re-engineering the strengths of our current central data center to provide equivalent levels of service and sophistication for a very different environment."

Likewise, Spiegel's first client/server database application is a manufacturing system used by approximately 50 people in one department. It consists of the OS/2 database manager, which IBM has renamed DB2/2, connected to IBM's DB2 on the mainframe via Micro Decisionware, Inc.'s (MDI) Gateway product. This is primarily a decision-support application, with download and inquiry only.

The next phase, which will include uploading information, will be used by up to 400 users in different departments. It will tap into other database management systems on the mainframe, including Computer Associates International, Inc.'s CA-IDMS.

One key architectural decision being revisited, Beulke said, is the use of MDI's Gateway. "When we evaluated it last year, it seemed to be the best solution," he said. But now IBM has announced its Distributed Database Communications Services (DDCS), which promises to be "much cheaper and easier than MDI," he said.

Where IBM will charge $4,000 for a DDCS site license, some middleware vendors charge more than $100,000, he said. So Spiegel will look into DDCS for the next implementation of its client/server database application, Beulke said.

Unique issues

Other users have to face technical issues unique to their environments. Lechmere, Inc. in Woburn, Mass., has Software AG of North America, Inc.'s Adabas on its IBM 3090-200E mainframe. It also has an IBM RISC System/6000 Unix-based computer in each of its 23 stores. The company is about to implement a receiving application in the stores by the end of the month.

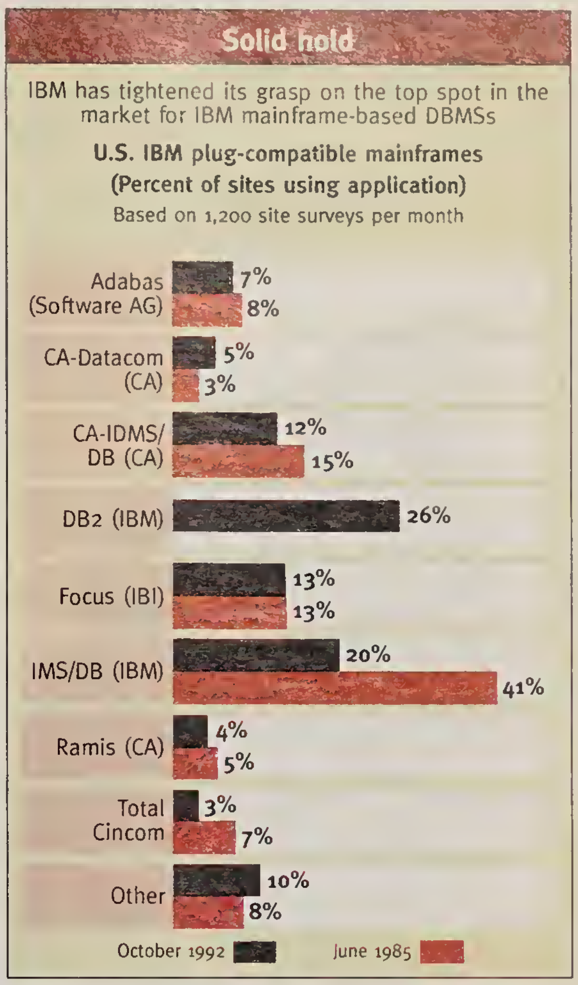
Each store has its own database that contains the store's inventory, among other things. Changes are uploaded to a central mainframe file. The application in the stores uses an emulator "to allow the computer to think it's an IBM Series/1," said Lou Kleynen, vice president of IS. "They're basically sequential files, and the emulator allows us to pass the data back and forth."

So, the biggest technical challenge Lechmere faced, Kleynen said, "was accessing data in the flat file. We have an Adabas structure for the new application, but we also need to maintain inventory on this other file. We wound up writing our own code to do that."

Still, the technical difficulties almost pale when compared to other problems. Rich Kolbe, director of MIS at Harley-Davidson, Inc., said, "People who make changes to the software on PCs and LANs have not always been in step with the changes we make to the centralized software. We put our hand on the burner once or twice, and there's an issue of educating the participants so they realize the dependency is there.

"As we come through, we realize we're raising the bar as to what we're expecting from both the end-user and MIS departments."

Solid hold



Source: Computer Intelligence/Infocorp   CW Chart: Michael Siggins

Very new

Database consultant Rich Finkelstein estimates that only about 200 or so companies are actively pursuing client/server database applications. "It's very new, and people are experimenting. It's definitely doable, but it's important not to have expectations that are too high."

Somewhere in the middle

No one ever said client/server would be easy, and that may be just as well. Among the many technical problems to resolve are which standards to adhere to, if any, and the advantages and disadvantages of using "middleware" vs. connecting the mainframe directly to the PC network.

Middleware is a term becoming widely used to describe a software package that connects the end user to many different mainframe and minicomputer databases. Middleware generally sits on a server on a LAN.

As such, it can access data no matter where it resides, whether it is in a flat file or must be called using SQL. Gateways, on the other hand, are a point-to-point connection, from one database or product to another.

Rich Finkelstein, president of consulting firm Performance Computing, Inc. in Chicago, said middleware's advantage over direct connection is its "flexibility." On the other hand, he said, middleware costs much more than directly connecting a LAN to the mainframe and is not necessarily as transparent.

For its part, a direct attachment to the mainframe can be limited to a specific number of users.

In any event, Finkelstein noted, customers must be careful about impacting the performance of the mainframe. "Client/server can put an unpredictable load on the mainframe and is very difficult to control," he said.

Another issue is that of standards. "There are competing standards of how to get to data in a distributed environment," said Howard Fosdick, an independent consultant. "My sense is that the vendors are all jockeying for position, and it's not clear how these different standards will fit together." — *Johanna Ambrosio*

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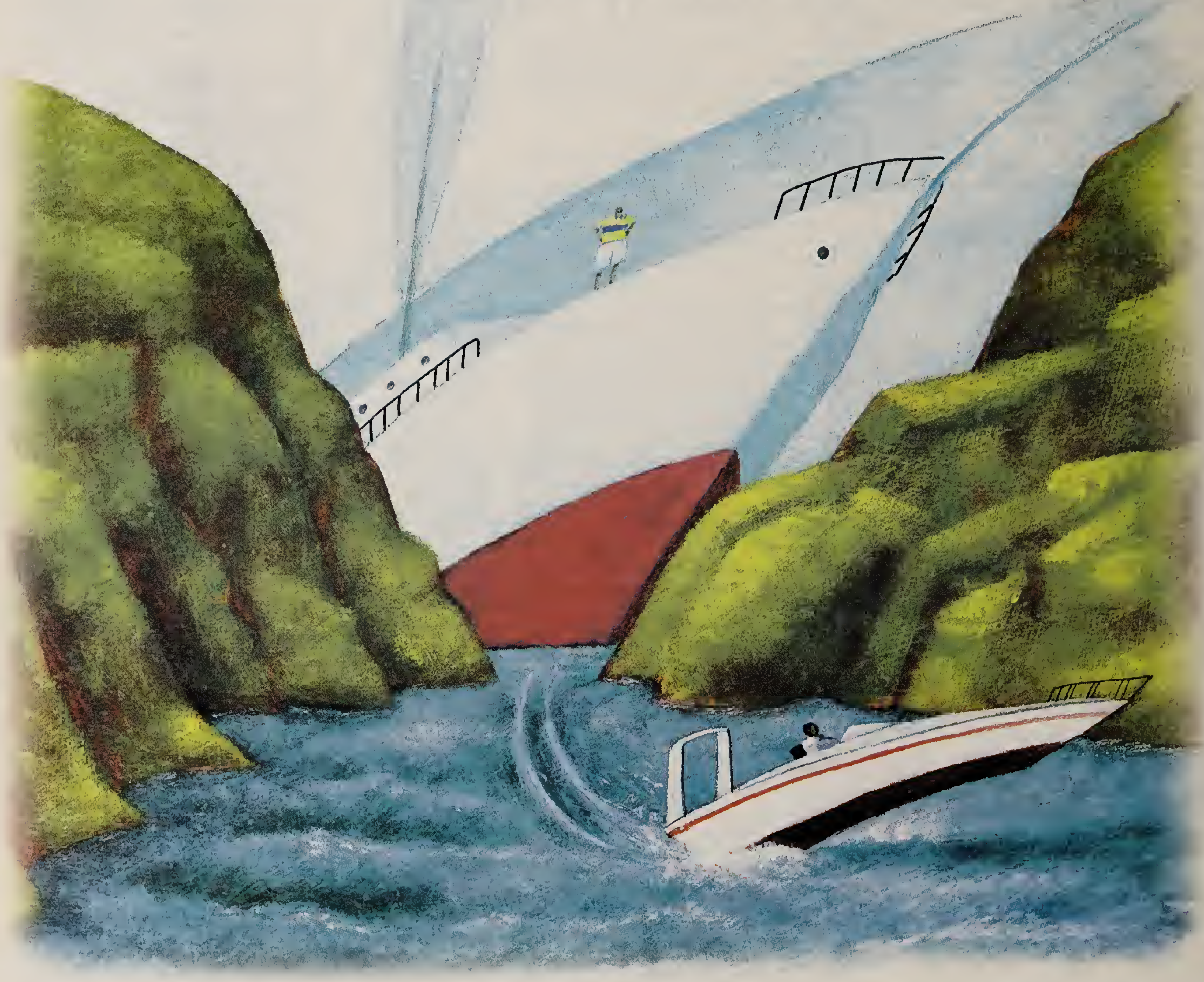

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Explosion spotlights LAN vulnerability

By Thomas Hoffman

NEW YORK

The majority of operations that were disrupted by the bombing of the World Trade Center last month were based on distributed systems and local-area network topologies. This has led information systems executives and industry observers to speculate that the incident will force companies to pay even greater attention to protecting mission-critical applications on distributed architectures.

"There's no question that anytime you have a disaster like this, people become much more aware of the rigors of protecting distributed technology," noted Craig D. Goldman, senior vice president and chief information officer at The Chase Manhattan Bank NA, which was forced to transfer 100 financial services employees and reroute phone lines to Chase Plaza and other nearby locations.

Most large companies with past disaster recovery experience successfully carried over their expertise to distributed architectures preceding the World Trade Center blast. However, many smaller firms with no prior experience were less fortunate.

Invaluable backups

The New York Clearing House Association (NYCH), which clears roughly $1 trillion in international transactions for member banks each day, had 10 members in the World Trade Center when the explosion occurred.

Four of those banks ended up using NYCH backup facilities in Manhattan to complete $90 billion in transactions on the day of the bombing, according to George F. Thomas, senior vice president and director of data processing at NYCH.

RON HAVIV/SABA

World Trade Center occupants *regroup after explosion forced systems to be moved to backup sites*

Seventy percent of the systems at the World Trade Center that were affected were composed of Digital Equipment Corp. VAXs, Tandem Computers, Inc. fault-tolerant systems and hundreds of LANs, according to Tari Schreider, chief executive officer at Contingency Planning Research, Inc., a Jericho, N.Y., disaster recovery market research specialist.

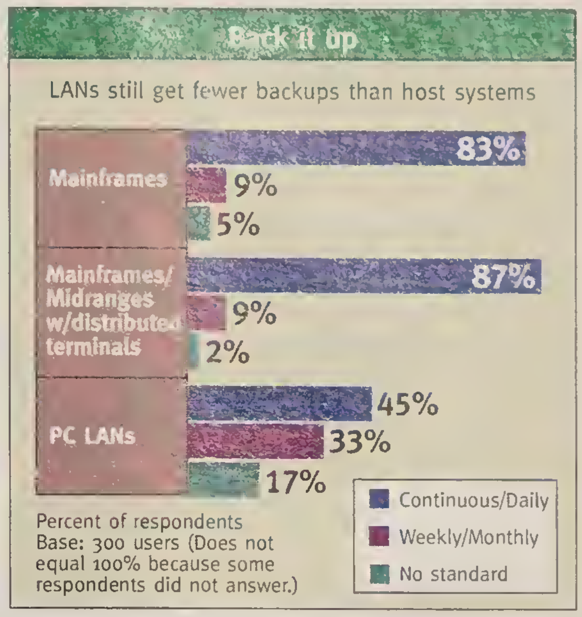
Based on early investigations among World Trade Center tenants, Schreider said most of the organizations that suffered data losses or disruptions to distributed systems were backing up data only on a weekly or monthly basis.

At the Commodities Exchange, Inc. (Comex), all trading information is "shadowed" or backed up and routed over an LU6.2 protocol network to computers at a backup facility. As a result, Comex did not lose any data, according to Jerome J. Jordan, Comex vice president of computer operations.

However, The New York Cotton Exchange was less fortunate. The exchange lost a small amount of data on its three Novell NetWare v3.11 LANs, according to Jack McLaughlin, manager of operations and statistics at The Cotton Exchange.

The availability of disaster recovery products for networks is easing the problem somewhat.

Palindrome Corp. in Naperville, Ill., offers a product called Network Archivist, which was designed to back up and restore data on Novell NetWare and Arcnet LANs. One of its customers, Segal Co., a World Trade Center-based benefits consulting firm, successfully used the product during the disaster, according to a telecommunications manager at Segal who requested anonymity.


Back it up

LANs still get fewer backups than host systems

Percent of respondents
Base: 300 users (Does not equal 100% because some respondents did not answer.)

Source: Comdisco Disaster Recovery Services

Little downtime
Brody White & Co., one of the largest commodity-only brokerages in the U.S., was able to reroute its distributed operations to XL/Datacomp, Inc.'s disaster recovery facility in Roseland, N.J., said Edward Rywalt, assistant vice president of corporate computers and telecommunications at Brody White. The company was fully operational two days after the explosion.

Electronic databases: Thinking aids of the future

By Lori Valigra

It was a sign of the times. Two students at MIT walking down the "Infinite Corridor," which links the Cambridge, Mass., school's mazelike campus, were overheard discussing their term papers.

"What are you covering in your paper?" one asked the other.

"I don't know. I'll have to do a keyword search of the databases and see what turns up," was the response.

While computer-generated term papers seem to defeat the purpose of the task — to think — electronic information databases are proving to be valuable aids for industry leaders and scientists. They are a quick way to become an expert on a competitor's finances, products or management without having to wade through stacks of magazines and newspapers. Trends can also be picked out of the records.

It all sounds simple, but is it? Until recently, most of the thousands of databases available via computer networks have had their own syntax, basically requiring an expert to do a thorough search of several different databases.

Even sign-off syntax can vary, said Linda Martinez, assistant engineering librarian at MIT's Barker Engineering Library. Choosing the wrong one — "bye," "logoff," "logout," "exit" — can keep the access time clock ticking and add expense.

MIT, which is one of the more aggressive universities embracing database technology for its student engineers, is tackling the nomenclature problem by using one of the newer database products that allow common commands across many different databases.

MIT is testing FirstSearch, a collection of 29 databases containing article indexes or abstracts. It is a relatively new product from OCLC, a Dublin, Ohio-based nonprofit corporation that started as the Ohio College Library Center.

FirstSearch is menu-driven. After logging onto the system via Internet, users are asked about their field of interest and are given several databases to check using a common set of commands.

The searches turn up a variety of results. For example, a sample search using the keywords "computer and Japan" found 276 references on the FirstSearch news abstracts database, including articles from *The Washington Post* and *The Wall Street Journal*. Using FactSearch turned up 31 references to publications such as *BusinessWeek* and the *Congressional Record*. A search for Disclosure, Inc., which has detailed financial information about companies traded publicly in the U.S., yielded 42 records.

But getting the listings, which can be printed from a PC, is only the beginning.

"After you find the information on the search, then you must find the library where it is located," Martinez said. There are a number of ways to do that. One involves going to WorldCat, the bibliographic database on FirstSearch, or dialing into library on-line catalogs.

Another is getting the full article by accessing an independent full-text database such as Mead Data Central, Inc.'s Nexis or WAIS, the Wide Area Information Servers database located at Thinking Machines Corp. in Cambridge, Mass. Services such as Nexis, however, are expensive and carry strict usage guidelines.

WAIS, which is accessible through the Internet, can search 359 full-text databases. The downside is that its command line interface makes it difficult to use.

Though many of the databases are geared for use by large institutions, some are affordable for small firms, according to Joan Stapleton, a representative at Nelinet, Inc., a Newton, Mass.-based membership organization for New England libraries that brokers OCLC databases in New England.

FirstSearch for non-OCLC members costs $100 per year, plus $450 for each block of 500 searches. In addition, there is a dial-up access fee of $8.40 per hour for those with CompuServe accounts, and a direct-dial charge of $10.80 per hour on a WATS line.

Valigra is a free-lance writer based in Cambridge, Mass.

Cost considerations

Whether easy to use or not, full-text databases can quickly ring up high access charges. Rae Jean Wiggins, a librarian at MIT's Sloan School of Management, said one three-minute search on Nexis cost $81 to download three files.

International Data Corp. expects unit shipments of full-text retrieval software to grow at a 29% annual rate through 1996, largely becuase of the popularity of CD-ROM.

Wang uses own imaging systems to climb out of bankruptcy

By Melinda-Carol Ballou

LOWELL, MASS.

Wang Laboratories, Inc. will release its reorganization plan this week in an attempt to move out of Chapter 11. In an acid test of its own technology, the company is using a Wang imaging system to handle the hundreds of thousands of documents needed to meet the court's March 16 deadline.

Management and reconciliation of the claims of Wang's creditors involve the services of two other companies: Poorman-Douglas Corp. in Portland, Ore., and Federated Claims Services in Cincinnati. Poorman was appointed to handle claims management between the court and Wang, while Federated Claims provides services to help manage information about the resolution of those claims.

"One of the problems in bankruptcy processing for us was that no one product did it all in terms of bringing in the claims documents as well as reconciling them. We had to go to multiple vendors," said Jean Dixon, MIS consulting analyst at Wang.

The court sent creditor claims information to Poorman, which scanned them into the imaging system. Poorman used the Seaview image document and management system, which was developed by Science and Engineering, a Wang third-party partner, and is based on Wang's Open Image system and Gupta Corp.'s SQLBase database management server. The Open Image system consists of software that allows users to access, update, display and rotate images, as well as application programming interfaces that let users add images and access them across platforms.

Wang employees then updated their IBM mainframe in Lowell to reflect information such as dollar amounts and dates received. Clients at Wang requiring access to the data did so over a local-area network. The LAN was comprised of a Novell, Inc. 486 server and approximately 20 Intel Corp. 80386 clients using Microsoft Corp.'s Windows and accessing the Gupta database server that housed the claims information and a fax server.

Then Federated Claims provided reconciliation of claims and analysis services. That system uses a 486 server running The Santa Cruz Operation's SCO Unix and an Oracle Corp. database.

ON SITE

Wang
Lowell, Mass.

Challenges: To move out of bankruptcy fast and resolve more than 30,000 claims from creditors.

Technology: Seaview claims management software based on Wang's imaging system and Gupta's SQLBase Server and Federated Claims Services' claims reconciliation software, which uses an Oracle RDBMS on SCO Unix.

Results: Wang is expected this week to file its reorganization plan — on time.

Users could bring up a claims image in one window while, in a second window, they could access the data needed to resolve that claim.

Praise from service providers

According to Wang's claims service providers, the use of Wang's imaging products is greatly facilitating the move from bankruptcy to reorganization.

"I cannot express to you the amount of paperwork involved in large bankruptcy cases — with 50,000 creditors, an average eight to 10 pages per creditor per claim and then three copies of each page," said Noel Bosco, an image representative at Poorman. "The advantage with the Wang system is the SQL-based database server, so that accessing large volumes of information is extremely quick and so is the creation of reports."

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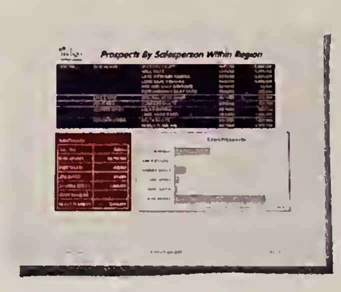

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DIGITAL UPDATE
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March 1993

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Let Digital's Computer Downsizing Solutions Give You More POWER over Your Information

The business environment of the '90s challenges organizations to work faster, better, and at a lower cost than ever before. Styles of computing that suit large, monolith, routine batch jobs cannot sustain the free flow of information and resources required by businesses today.

Companies need the freedom to provide their employees with access to information when, how, and where they require it. Fortunately, this need coincides with a dramatic increase in performance and a downward turn in the price of computers. Digital helps you take advantage of this price/performance — enabling you to put powerful information tools into the hands of your business professionals.

Our strategy is to provide you with a more flexible and open future. We'll help you plan, design, implement, and manage information environments that are cost-effective — from initial purchase through ongoing management and change.

Enabling Your Company to Work as It Wants to Work

Providing your professionals with the freedom to access information when, where, and how they need it requires the foundation of a disciplined, standards-compliant environment. Whatever your current starting point, Digital can help you quickly and efficiently achieve a standards-compliant environment that is open to the best components now and in the future.

Your professionals use desktop units and applications of choice, benefiting from behind-the-scenes disciplines that enable transparent data flow across multiple vendors' clients, servers, and applications. Digital delivers open computing environments that provide mainframe levels of performance, functionality, reliability, security, and integrity — but with far more flexibility and at much less cost.

Digital offers you the freedom not only to choose the best information tools and products, but also to orchestrate and adapt these into a whole that best suits the way your company wants to work. Take advantage of our unrivaled depth and breadth of connectivity and integration tools, products, and services. We provide:

- **Worldwide consulting, training, and systems integration professionals**
  Our experts work with you to manage and balance the people, business, and technology dimensions of distributing information throughout your business.
- **Multivendor integration**
  You choose the best components to serve your business — from desktop to data center. We can integrate and support almost any client or server your company is likely to own now or in the future. Plus, we have packaged these capabilities into products that deliver integration and interoperability right out of the box. For example, Digital's Network Application Support (NAS) capabilities, such as PATHWORKS, enable you to interconnect multivendor systems and achieve a free flow of information across platforms, sites, and groups.
- **Unbounded capacity at far less cost**
  Utilizing the world's fastest 64-bit RISC microprocessor, our Alpha AXP family of open server and desktop systems give you unbounded capacity — at a fraction of mainframe cost.

Take Advantage of Our Experience

Digital pioneered moving information out from the data center to work groups — whether they're in the same office or around the world. We'll help you achieve the most flexible and cost-effective approaches to your information requirements — today and tomorrow.

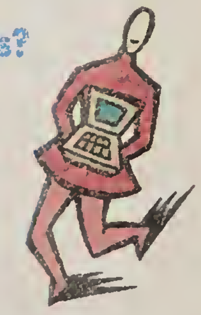
For more information on Digital's computer downsizing solutions, call 800-332-8228. ▪

What drives companies to move to more cost-effective computing environments?

Two reasons.

Not only do you want to **increase the payback** *of your information technology dollar, but you're also looking to* **increase the productivity** *of your frontline professionals.*

Digital helps you do both.



For Success in Downsizing, Scott Paper Uses the Team Approach: Digital and Unidata

In the late 1980s, Scott Paper — the world's leading supplier of tissue paper products — decided to downsize operations. In fact, company management issued a downsizing directive to every division of its organization, including MIS.

Since the actual downsizing process was left to division managers, MIS at Scott's Everett, Washington, mill focused on improving its computing system as a way to help the Philadelphia-based company cut costs.

With a critical mission at hand, Scott Paper turned to Digital and Unidata for assistance.

The Problem

Operations at the Everett mill were dependent on a multisystem environment — one database system to manage the business applications, and various other computers from different vendors to manage all aspects of production and manufacturing. As a result, MIS had to maintain diverse computing environments, and users had to learn to use several computing systems.

The mill needed a single vendor to provide systems for both business applications and shop floor production. After a thorough evaluation, Scott Paper chose Digital to provide a uniform, integrated computing environment via a VAXcluster system.

Power, Flexibility, and Openness

The Digital hardware implemented at Scott Paper included two VAX 6000 Model 410 systems and three VAX 3000 systems. The VAX 6000, chosen for its industry-leading technology, price/performance, and flexible upgrade path, also provides Scott Paper with:

- A powerful CPU
- Expanded memory and storage capacity
- High-speed networking capabilities.

In addition, the clustering feature of OpenVMS has given the paper manufacturer an efficient, economical way to share data resources.

Unidata Serves as Critical Link

Once Scott decided to standardize using Digital hardware, one challenge remained: how to continue using its older non-Digital database system in the new OpenVMS environment. Careful research led the company to Unidata, a Digital independent software vendor headquartered in Denver, and Creative Computing Solutions (CCS), a Unidata value-added reseller based in Fremont, California.

Unidata provides small, medium, and Fortune 1000 companies with a relational database management system (RDBMS) that supports relations and multidimensional arrays. Unidata's RDBMS operates under OpenVMS and UNIX, is compatible with Scott Paper's previous computing environment, and has enabled Scott Paper to run its main business applications with improved response time.

Plus, Unidata's compatibility with Scott Paper's previous database system allowed this system to be converted to OpenVMS — while retaining the same look and feel for users.

After six weeks of duplicating, testing, and tuning 100 programs and 20 files, CCS converted Scott Paper's old database system to Unidata software and then ported it to the OpenVMS environment. "The conversion went fairly smoothly without any major upsets," stated Wendell Harris, IS Manager, Scott Paper. "And we met all project timelines."

By moving to the OpenVMS environment, Scott Paper has maintained its original database system and reduced its IS costs by 20 percent — a significant contribution to the company's overall downsizing efforts.

The major benefits resulting from Scott Paper's decision to team Digital and Unidata include investment protection, no downtime, no retraining — and, most important, no hassle.

For information on Digital/Unidata solutions, call Terry Truman, Unidata's Director of Channel Marketing, at 303-294-0800. ■

Libbey-Owens-Ford Profits from Digital's Downsizing Solutions

Libbey-Owens-Ford Company's Auto Glass Replacement (AGR) Business Unit has added 69 service centers since 1988, and plans to establish 100 by the end of 1993. This continent-wide service network — including AGR's three giant depots — supplies local auto glass replacement shops that serve customers throughout the U.S. and Canada.

Building market share with this fast-growing service challenges AGR to meet market demand for quick response and competitive pricing by dramatically cutting distribution time-to-market and cost.

These goals drive AGR's move from an in-house application on an IBM mainframe to a Digital client/server environment — an environment that provides nationwide, distributed, real-time inventory management.

Connecting the service centers, depots, and headquarters, the Digital environment integrates and distributes AGR's preferred application packages: Distribution Management from McHugh Freeman Associates, for real-time inventory control throughout the supply chain; and DAI from Distributed Architects Incorporated, for integrated resource planning and order processing in all service centers.

VAX 4000 systems, the field office servers, will link to an Alpha-ready VAX 6620 system at AGR headquarters. "The power of Alpha AXP provides the right, high-performance match for our business strategy … at a far lower cost than a mainframe approach," says Rick Wagner, Senior Manager, IT, Libbey-Owens-Ford.

Digital Helps The Brookings Institution Save over $1 Million

With the help of Digital's computer downsizing solutions, The Brookings Institution's Social Science Computation Center (SSCC) has saved a total of $1.7 million over a six-year period. It spends less annually in areas such as computer maintenance, software, and peripherals.

Digital has been providing Brookings with computing power since 1970 — with the SSCC adopting VAXcluster system technology. But, as PCs assumed an increasingly important role at Brookings, the organization was faced with a dilemma. PC and VAX users needed to collaborate and communicate. Brookings needed to maintain both systems and cut costs at the same time.

The solution? Lower-cost and higher-performance Digital computers are servers to the growing base of PCs and Macintosh systems at The Brookings Institution. These desktop units are integrated with each other and the Digital server via Digital's PATHWORKS networking.

The SSCC has upgraded the VAXcluster system that functions as the server several times, moving smoothly from the VAX 8650 computers down to VAX 4000 systems. Now, with the lower maintenance and electricity costs, Brookings will recoup its equipment costs in two years.

States SSCC Director Jane Fishkin, "The SSCC accomplished this computer downsizing without endangering or impairing the flow of Brookings' most important asset: information."

The ALPHA AXP ANGLE

Taking Care of Business Means Utilizing 64 Bits Today

Why not stop working around your current technology, and start letting technology work for you? Don't waste countless hours maneuvering around the limits of your current computing system. Instead, use Digital's Alpha AXP 64-bit RISC architecture to implement new, more cost-effective ways of solving your business problems now and in the future.

The competitive advantage — it's what every business continually strives for. And that's exactly what Digital's 64-bit Alpha AXP architecture gives you. The power of Alpha AXP systems will assist you in meeting your business requirements today and tomorrow.

Today, Alpha AXP systems — from desktop to server — can dramatically enhance your existing applications. In terms of your business future, Alpha AXP systems open the door to new ways of approaching your business problems, without constraints and on your choice of platforms.

Plus, Digital's 64-bit computing architecture offers an unprecedented 25-year growth path — assuring you that today's investment will be protected well into the 21st century.

Supercomputers Introduce Power of 64 Bits

The unbounded power and precision offered by 64-bit computing was first introduced by costly supercomputers and has been garnering dramatic benefits for a handful of specific industries.

With 64 bits, engineers designing computer simulations are given finer granularity, increased accuracy, and greater interactivity. Thus, what once took months or years to design now takes days or weeks — with animated visualization that borders on reality.

For example, a major U.S. automobile manufacturer that once used real automobile prototypes for crash experiments saved months of time and millions of dollars by implementing electronic crash simulations to collect critical information.

Along the same lines, the unbounded performance of 64-bit computing helped a leading U.S. chemical company create a synthetic catalyst in weeks instead of years — saving the company millions in experimental chemistry costs.

Alpha AXP Makes Supercomputer Power Affordable on the Desktop

Today, Digital's Alpha AXP architecture puts supercomputer power on the desktop for less. In fact, our 64-bit technology has the best performance and price/performance ratio in the computing arena. Now, virtually every industry can access the power of 64 bits to address their business problems.

Technologies that benefit from the power provided by Alpha AXP systems include:

- **Graphical representation**

Used in applications including CAD/CAM, molecular modeling, and computational fluid dynamics, this technology will gain significant design time advantages — resulting in greater productivity and cost savings for industries.

- **Information handling and retrieval plus recognition/interpretation**

Applications using technologies such as unstructured data (document image), EDM, voice, text-image search by content, and knowledge bases will dramatically benefit from the processing power of the Alpha AXP architecture. For instance, the paper mountains of insurance companies can be scanned into EDM servers to reduce search times from days to seconds.

- **Scheduling and multivariable problems**

Utilizing Alpha AXP systems, applications such as inventory and replenishment/logistics, chain management, and crew and maintenance scheduling can be treated in increasing detail in the retail industry and many others in order to garner higher returns.

- **Mathematical computations**

Applying 64 bits to risk analysis, realtime computation, and complex event prediction will allow banking and finance industries to solve larger problems faster, and with greater detail and accuracy.

Organizations Select Alpha AXP Systems as Computing Technology of Choice

Most often, you're not concerned about how technology works, but only that it works to provide business benefits. Many organizations worldwide have selected Digital's Alpha AXP systems for the compute power they offer — power that ultimately enhances business productivity and profit.

Boston Edison Plugs into the Power of Alpha AXP Systems

Boston Edison has recently selected two Alpha AXP systems (the DEC 3000-500 system and the DEC 3000-400 system) to run its primary application, EMS/SCADA. In its search for an open system that offered a distributed workstation-based solution, the company chose an Alpha AXP system over the IBM RS6000 because of the system's price and price/performance advantage. Digital's 64-bit technology will see Boston Edison into the 21st century.

Tampere University Replaces Supercomputer with Alpha AXP Systems

Finland's Tampere University of Technology needed to add more compute power to its engineering computing lab. It found the solution in the 64-bit arithmetics provided by Alpha AXP systems. Sixty-four bits will give the university a new dimension for its technical computing — enabling users to solve more complex problems at a much faster rate. The Alpha AXP systems will be utilized in various physics, electronics, and signal processing simulations, and for structural analysis tasks.

Alpha AXP Architecture Satisfies the Appetite of Garfield

A small company that creates and licenses cartoon animation, PAWS, Inc. uses a computer base of thousands of images — including Garfield,© created by company president Jim Davis. With so many memory-intensive images, PAWS has already reached the 4-gigabyte memory limit allowed by its 32-bit system. According to a company spokesperson, the company needs 64 bits now. Thus, plans are under way to move to Digital's Alpha AXP architecture. Initially, the Alpha AXP system will allow PAWS to double the data it manipulates at one time — ultimately saving time, increasing productivity, and positively affecting the company's bottom line.

Take Advantage of the Power and Affordability of Alpha AXP Technology

Alpha AXP technology can help companies across a broad range of industries improve cash flow, increase profitability, enhance productivity, and gain a competitive edge. With the best price/performance ratio in the industry, it makes good business sense to utilize 64-bit technology today in order to maintain your competitive edge tomorrow. ■

CAN YOU AFFORD TO WAIT?

Your 32-bit system may be all you need today. But how about next year? In three years? What about five years from now? With new technologies such as imaging, voice integration, and full-motion video as the next wave of application computing, will your current system be able to handle the dramatic increases in data demands?

In almost every industry, 32 bits just won't be enough to run your business effectively. And it's going to happen sooner than you might think. Take a look at some key facts.

◆ Mainframe databases are growing at 25 to 30 percent per year with conventional data. Today's system limitations are already a concern for a number of businesses. With 64 bits, those limitations disappear.

◆ The size of memory is increasing, while the price is decreasing. By 1995 — or sooner — typical workstations will have 2 gigabytes of memory. In the very near future, 32 bits won't be enough to handle the memory available. Sixty-four-bit systems will take full advantage of this cheaper memory, enabling new styles of application design without limitations.

◆ Only 45 seconds of full-motion video (at 24 frames per second) use up all the virtual memory of a 32-bit system. For those companies who want to approach business problems through leading-edge applications that utilize new technologies such as imaging, voice, and video. 64 bits is the answer.

◆ Most 32-bit systems can access only files of 4 gigabytes or less in length. While a majority of applications do not stress these limits today, some — like CAD applications for complex chip designs — are already pushing the limits. A 64-bit system puts no limitations on file size

THE H9A00 SERIES FROM DIGITAL

PERFORMANCE AND ECONOMY IN A SYSTEM ENCLOSURE PLATFORM

Digital's H9A00 International Enclosure Series (IES) provides both an economical and a truly high-performance system enclosure platform that is state-of-the-art compliant with European and U.S. standards. You can choose from a range of models designed for particular applications — from "rack-and-stack" models to those ideally suited for LANs and LATs. Or, customize a model to answer your specific business needs.

Well-suited for system configuration either in the data center or office, the H9A00 Enclosure Platform is supported for use by the SF400 Mass Storage Array and DECsystem 5900, plus all Alpha AXP systems, including the DEC 3000 AXP system, the DEC 4000 AXP system, and the DEC 10000 AXP system.

Plus, Digital's H9A00 platform offers a convenient mounting platform with conventional EIA/RETMA mounting formats, with optional metric adapters, or with total metric mounting formats. In addition, virtually every rack-mounting device available in the industry can be easily installed into the H9A00. ■

COMPLETE CABINET ASSEMBLIES

Order #/Price	Product Description
H9A00-AC $2,595	Cab Assy, free standing, operator access, full vented ft dr, stabilizer (120 V 24 A)
H9A00-AD $2,595	Same description as above (240 V 12 A)
H9A00-AE $2,595	Cab Assy, free standing Communications Cab w/dk transparent ft door (120 V 24 A)
H9A00-AF $2,595	Same description as above (240 V 12 A)
H9A00-EA $2,995	Cab Assy, free standing w/o front door, w/front vertical trim and stabilizer (120 V 3-ph)
H9A00-EB $2,995	Same description as above (240 V 3-ph)
H9A00-EC $2,395	Same description as above (w/o power)
H9B00-AC $2,295	Cab Assy, expander (w/o end panels), operator access ft door, stabilizer (120 V 24 A)
H9B00-AD $2,295	Same description as above (240 V 12 A)

ACCESSORIES

Order #/Price	Product Description
H9C00-AB $250	End Panel Assy, non-shielded
H9C00-EA $325	Front Door Assy, op-access, full vented
H9C00-EB $300	Front Door Assy, locking, full vented
H9C00-LA $120	Top Cover, solid (w/o vents)
H9C00-FA $1,000	Frame Assy, 600 mm, non-shielded
H9C00-DA $225	Front Trim, vertical for 600 mm

To order Digital's H9A00 (IES) products or accessories, call 800-DIGITAL (800-344-4825) and press 1.

Supplies Buy DEC Offers Computer Supplies at Big Savings

Digital's Supplies Buy DEC program offers popular brand-name computer supplies and accessories to Fortune 1000 customers — as well as small and medium-sized businesses. Look for dramatic cost reductions on toner, diskettes, ribbons, magnetic tape, and hundreds of other items from leading manufacturers, including Canon, 3M, Hewlett-Packard, and IBM. And, discount prices are only the beginning. With Supplies Buy DEC, you also get:

- Fully guaranteed brand-name products
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- Ongoing producr list expansion
- Money-saving volume pricing.

To receive your FREE catalog — complete with discount pricing and ordering information, call 800-DIGITAL (800-344-4825), press 1, and ask for a Supplies Buy DEC catalog.

Take Advantage of Digital's PrintServer 32 Offers — and Save $4,000

Place your order for a new PrintServer 32 and Digital will give you three months' worth of printing supplies — a $1,400 value — for free. Supplies, including toner, drum, and cleaning kit, come with the purchase.

In addition, DECdirect will give you 10 percent off the price of a PrintServer 32 with the trade-in of your PrintServer 20 or PrintServer 40. We'll give you credit for your similarly priced competitive unit as well.

Combine these time-limited offers and save close to $4,000 off the list price of a PrintServer 32.

To order Digital's PrintServer 32, call 800-DIGITAL (800-344-4825) and press 1.

Downsize without Compromise with UNIX from Digital

Escape the downside of computer downsizing with UNIX from Digital. Our DEC OSF/1 environment provides all the tools you need for systems management, applications development, networking, and security — plus, it allows full interoperability with the major desktop systems you already have. DEC OSF/1 supports all standard UNIX interfaces and is designed to run all major UNIX applications, including those that run on System V and BSD. In addition, DEC OSF/1 runs on Digital's powerful 64-bit Alpha AXP systems.

To learn more about UNIX from Digital, visit Booth #4707 at UniForum 1993, to be held March 17–19, at San Francisco's Moscone Center.

For information by fax on Digital's UNIX solutions, call 800-842-7027.

Digital's VT420 Text Terminals: Buy Five and Get One Free

For a limited time, we're offering significant savings on our VT420 Text Terminal — an industry-leading text terminal that includes dual sessions and a three-year, on-site warranty.

When you purchase five VT420 Text Terminals at $509, you get the sixth terminal free — reducing the cost of a single terminal to $424.

To order VT420 Text Terminals, choose one of these options:

- **Utilize Digital's toll-free fax line at 800-234-2298**
- **Access the online Electronic Connection at 800-234-1998, from any Digital-compatible terminal or PC**
- **Call 800-DIGITAL (800-344-4825). To order, press 1 and reference code GGC/GGD. For technical assistance, press 2 and ask for ext. 6Z3/6Z4.**

VAX 10000 Systems Are "POWER PACKED" with Digital's Solid State Disks

It's all there — lightning-fast speed, availability, and security. Now, Digital's EF5x Solid State Disks (SSDs) are embedded in every VAX 10000 system — providing the near-instantaneous access to data necessary to unleash the power of these high-performance systems.

Literally hundreds of thousands of CPU cycles can be idled, waiting for access to critical data that's stored on traditional devices. However, the 0.25-ms access time of the EF5x SSDs provides up to 100 times faster access to data and magnetic disks. The result? Performance of response-time-critical applications is significantly improved, along with your business' bottom line.

The EF5x series of solid state disks supports not only VAX 10000 systems, but all DSSI-based systems experiencing poor performance caused by slow I/O. The EF5x is the same size as RF magnetic disks and plugs-and-plays into VAX 4000 system cabinets, VAX 4000 expansion cabinets, and SF Storage Array cabinets. In addition, an integrated Data Retention System is built in to provide safe, nonvolatile storage for your most critical data — even if power is lost.

From ESE50 Solid State Disks for SDI-based systems to EF5x Solid State Disks for DSSI, Digital has the right, cost-effective devices to support your mainframe-class, distributed, and server applications.

Order#/Price	Product Description
EF51R-AA*/AF** $19,000	107 MB DSSI solid state disk with integrated Data Retention System
EF51R-LA** $33,250	Two 107 MB solid state disks and modular mounting shelf for VAX 10000 and VAX 7000 systems
EF52R-AA*/AF** $32,000	205 MB DSSI solid state disk with integrated Data Retention System
EF52R-LA** $56,000	Two 205 MB solid state disks and modular mounting shelf for VAX 10000 and VAX 7000 systems
EF53-AA*/AF** $35,000	267 MB DSSI solid state disk without data retention

*Factory-installed option

**Field-installed option

To order any of Digital's solid state disks, call 800-DIGITAL (800-344-4825) and press 1. ■

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New Products

Power supplies

Para Systems, Inc. has announced the A300 and the A425, which are part of the Minuteman Alliance (A) Series.

According to the company, the products are advanced, simulated sinewave standby uninterruptible power supplies.

The Alliance units are self-diagnostic when turned on. They feature site-wiring fault and a wall socket testing system that tests for improper grounding.

Shutdown software is available for the A425.

The units were designed to protect from overload in AC and DC mode, brownouts, blackouts and spikes.

The Minuteman A300 costs $159, and the A425 costs $259.

▶*Para Systems*
1455 LeMay Drive
Carrollton, Texas 75007
(214) 446-7363

Utilities

Data 21 has announced CICS.Help 4.4, the Help Presentation Manager for CICS.

According to the company, the product allows for the creation of on-line manuals, hypertext and Common User Access Help and Prompts.

A new Dynamic Database Access feature and/or a command-level exit shows data from DB2, data dictionaries and VSAM as Help text and Prompt selection lists.

Hypertext features include Keyword Search, Browse Topics and Topic Prints. Various authoring platforms can be employed, including IBM's ISPF and TSO and WordPerfect Corp.'s WordPerfect.

Prices start at $14,995 for MVS and $6,995 for VSE sites.

▶*Data 21*
19120 Van Ness Ave.
Torrance, Calif. 90501
(310) 212-9940

Database management

Softworks, Inc. has introduced the Catalog Solution.

According to the company, Catalog Solution is composed of Version 2.3 of the Catalog Scan and Version 6.1 of the Mechanic VSAM/Volume Data Set (VVDS) Forward Recovery.

Catalog Solution has the ability to locate data sets that need maintenance from criteria such as percentages used and number of extents.

Relational inconsistencies with Volume Table of Contents, VVDS and Basic Catalog Strutures (BCS) are analyzed and assistance is given to resolve them.Upleveling restored VVDSs and BCSs is another Catalog Solution capability.

License fees start at $15,500.

▶*Softworks*
7700 Old Branch Ave.
Clinton, Md. 20735
(301) 856-1892

I/O devices

MPI Technologies, Inc. has introduced the Blue Kit for the LaserJet 4, a coaxial/twin-axial Intelligent Printer Data Stream (IPDS) emulation package.

The product enables Hewlett-Packard Co.'s 8 page/min. LaserJet 4 laser printer to operate as an IPDS printer in the IBM S/3X-Application System/400 (twin-axial) midrange and S/370 (coaxial) mainframe environments, the company said.

The Blue Kit features "automatic sharing," which allows the LaserJet 4 to be used in three modes: by an IBM mainframe in a non-IPDS mode, in IPDS mode by a mainframe or midrange or by network or PC in a PCL mode.

The Blue Kit costs $2,995.

▶*MPI Technologies*
Suite 301
4952 Warner Ave.
Huntington Beach, Calif. 92649
(714) 840-8077

SYNERGY FOR ENTERPRISE TAPE MANAGEMENT

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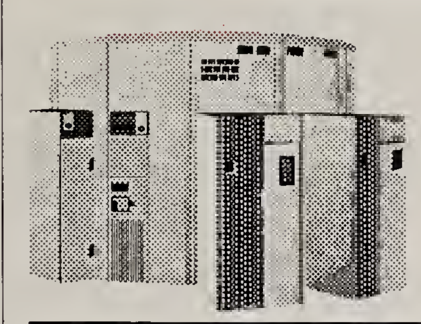

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Silo Sentry™ from Pro-Cubed Corporation enables users to manage resources within the Automated Tape Library System without manual intervention. Through a process called **Logical Ejection,** all datasets and their associated volumes are copied from the automated robotic facility to external media, thus making the original tape volumes available for re-use by other critical production datasets.

Optionally, all Logical Ejection functions and features can be applied to the Manual Tape Library providing **maximum media utilization** and media conversion via exploiting new hardware and software technologies.

PRODUCT BENEFITS OF SILO SENTRY

- Automatically populates newly installed robotic facilities with desired datasets.
- Independently **Manage Scratch Pools** for manual and automated tape libraries.
- Synchronizes the MVS catalog, the Tape Management System catalog, and the automated robotic facility CDS.
- Aids in **Disaster Recovery Management** by coping critical production datasets to Remote Electronic Vaulting Facilities.
- Can reduce new hardware acquisitions, manpower requirements, and the lead time to **exploit new technology**.
- Provides a **synergistic** approach to capitalize on your current data center environment investments.

Functions and Features of Silo Sentry™

- Multi-Volume dataset support
- Multi-File Multi-Volume dataset support
- IDRC / ICRC / EDRC data compression support
- Tape to DASD and Optical Storage conversions
- Dataset Stacking and Re-Blocking facilities
- Dynamic Media Rotation facilities
- Catalog and Uncatalog support
- HSM / DMS / FDR archiving support
- Generic Dataset Filtering Patterns
- Electronic Data Transfer support
- Automated Physical Ejection
- TMS / TLMS / EPIC / RMM support

Once installed, Silo Sentry enhances your Manual and Automated Tape Library Facilities with functions and features that make "LIGHTS-OUT OPERATIONS" a reality. For more information call Pro-Cubed toll-free.

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White Paper

IDC
INTERNATIONAL
DATA
CORPORATION

RAID

The Future of Intelligent Storage Subsystems

TO CHOOSE IPL STORAGE OVER IBM, YOU'D BETTER HAVE SOME PRETTY GOOD REASONS.

HERE THEY ARE.

Number one, no one knows AS/400 storage better than IPL. (Not even IBM.) But there are a lot more reasons why users everywhere are switching to IPL for all their storage needs. Take our industry leadership, for example. With 20 years of IBM experience, IPL was first to offer disk array technology to AS/400 users, first to introduce affordable mirroring, and first to bring IBM IDRC to AS/400 8mm tape products. When it comes to fault-tolerant midrange storage, no one is more innovative than IPL.

As proud as we are of our industry firsts, we're just as proud of our breadth of storage solutions. We offer the widest range of AS/400 disk and tape products for every application. Each one is 100% IBM-compatible, with unmatched price/performance advantages. And, time and time again, in independent reliability tests, IPL products exceed their IBM equivalents. All of our products are backed by a worldwide support network with over 160 IPL ServiceONE™ locations in North America alone.

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ipl
SYSTEMS

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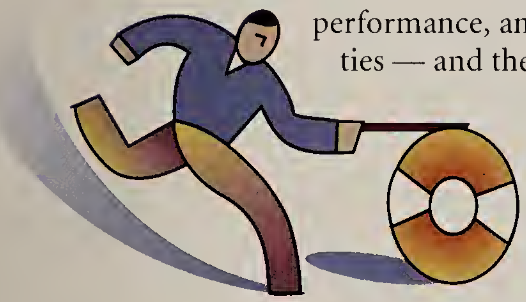
Introduction

More than $50 billion is spent annually on magnetic storage device acquisitions. Total storage expenditures typically comprise between one-third and one-half of IS hardware budgets. Despite these imposing figures, only 5% of the information used today is stored electronically.

This is changing. As the cost per bit of electronic storage continues to decline at more than 20% per annum, the amount of data stored on disk will increase fourfold by 1996. In large measure, this growth is attributable to the millions of standalone desktop computers becoming connected to networks and host-based systems. Users of these computers have a constantly growing need for data accessibility.

Estimates from users running heavy transaction workloads in mission-critical environments indicate that they lose more than $100,000 during every hour their disk-based data is unavailable. While such losses are not common, the opportunity costs and productivity losses associated with data inaccessibility can still be devastating. The bottom line: unavailability of information can make or break a small business and cost a large one millions of dollars.

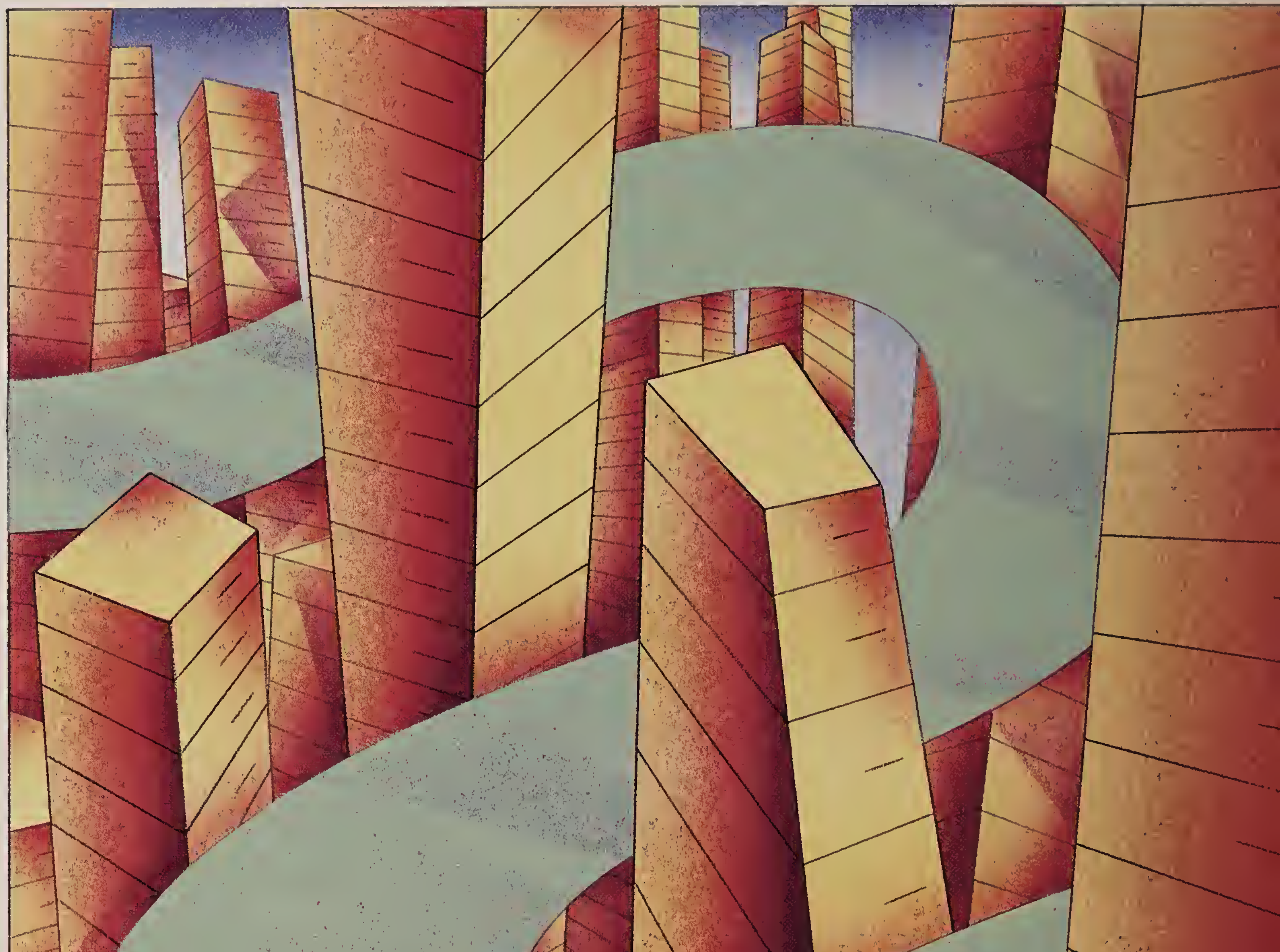
In today's rapidly changing information technology environment, high availability requirements are no longer confined to the "glass house" of corporate computing. The widespread use of distributed processing has brought high-demand storage requirements to what was previously considered to be the technology hinterlands. More users than ever are clamoring for access to storage, consistent performance, and sophisticated storage management capabilities — and they want them around the clock.



Redundant Arrays of Independent (or Inexpensive) Disks (RAID) is the first step toward ensuring continuous data access. This fault tolerant disk design technology realizes its objective through techniques that dramatically increase the mean time to data loss — but frequently at the cost of system performance. The key to successful RAID deployment is understanding both its advantages and disadvantages. RAID offers a technology balm for users that are caught up in today's Darwinian high-tech economy. At a time when these users need every advantage they can grasp, RAID is beckoning.

This White Paper was written independently of the Computerworld *editorial department by David Vellante, IDC Senior Vice President, Systems, Storage & Software Research.*

For more information on the White Paper Program, please call 508-879-0700.



RAID: The Future of Intelligent Storage Subsystems

IDC research indicates that nearly 40% of U.S. mainframe sites are actively pursuing a downsizing strategy by taking one of two courses: actively moving core applications off the mainframe onto smaller distributed platforms or confining new application development to smaller distributed platforms. The two primary motivators for downsizing are cost savings and improvements to end-user access and service. In addition to saving money on hardware and software, downsizing users are finding that their overall access to information is improved.

Obviously, mainframes are the losers in this downsized environment. In fact, IDC research indicates that one in five IBM 4381 mainframes is at risk of being retired over the next 18 months. Many of them will be replaced by Intel microprocessor-based network servers running Novell's NetWare. Others will fall victim to RISC-based servers from companies such as IBM and Sun.

Survey results also indicate that downsized data requirements are surprisingly mainframe-like. When asked to describe downsized data requirements in terms of their frequency of update and the need for public access, users indicate a very high level of update activity. This suggests heavy transaction processing workloads. Users also indicate a high degree of downsized data sharing.

Clearly, even though mainframes are being discarded in favor of smaller processors, they are leaving behind a computing environment little changed in terms of storage profiles, data availability, performance and storage management needs.

METHODOLOGY

In addition to the extensive use of survey data, this White Paper draws upon IDC's RAID supplier and product database. Information in this database is derived from ongoing discussions with more than 90 suppliers of RAID and RAID-related products. The database contains detailed specifications on more than 250 RAID products.

Finally, IDC has tapped its ongoing relationship with the consulting firm, Optimum Configurations, to better understand disk and disk subsystem performance. Optimum Configurations specializes in applying software modeling techniques to solve storage and I/O systems development and marketing problems.

USER STORAGE REQUIREMENTS

While installed gigabyte growth profiles vary within major systems categories, IDC research reveals consistent priorities and a willingness to trade off certain storage features in order to achieve IS proficiency. For instance, two-thirds of surveyed commercial users describe availability — the ability to retrieve desired information when it is needed — as a priority and are willing to pay a premium for it even if it means sacrificing some performance.

Users should evaluate disk subsystem requirements with three things in mind:

- Availability needs, measured by the costs of inaccessibility to disk data.
- Performance requirements, based on the link between I/O transaction volume and revenue generation. For example, the better the airline reservation system performance, the more tickets that can be sold.
- Storage management, including capacity requirements, space management, backup issues, investment protection and staff productivity.

Availability

When it comes to availability, only a minority of users (less than one-third) are unwilling to pay any premium for improvements. Typically, operations need 24-hours-per-day, seven-days-a-week, 52-weeks-per-year uptime, although some get by with availability provided during normal 40-hour-week working hours. The penalty for not having availability can be high, as some users report they have actually lost as much as $100,000 per hour per user when stored data was unavailable. Frequently, these users are operating in a high profile, "bet your business," online transaction processing environment.

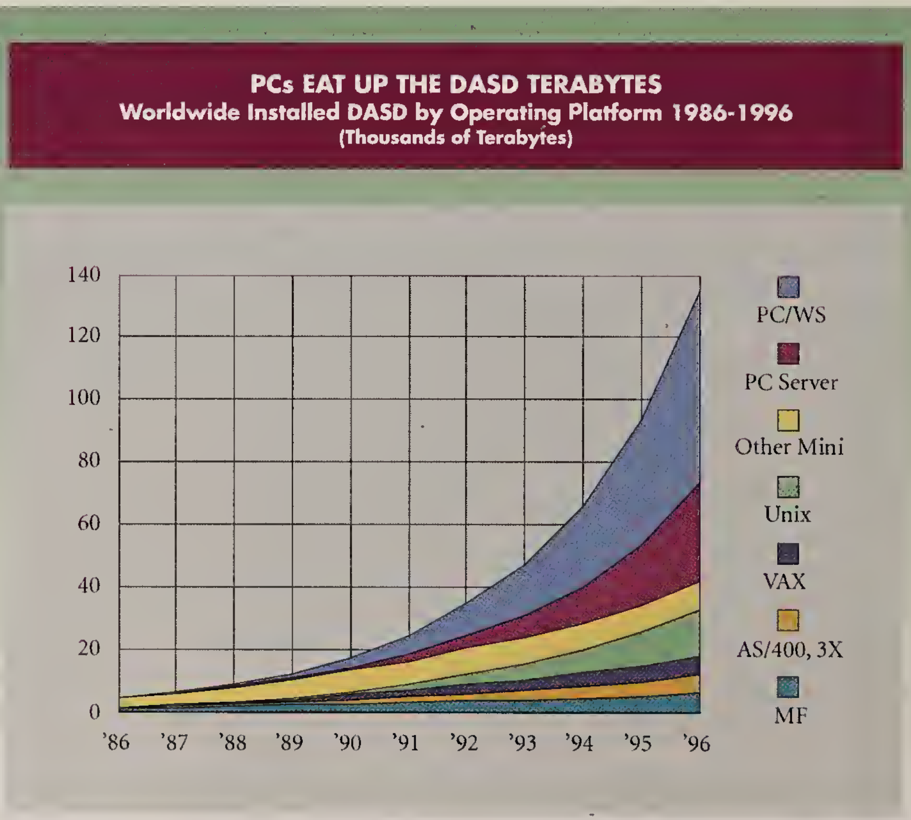
Performance Must Be Cost-Justified

Performance often becomes a point of contention, and the ways in which users measure performance vary dramatically. Most users in technical supercomputing environments use transfer rates (and subsequent job run-times) as their primary performance measurement. In commercial environments, response times or I/O operations per second (or both, in combination) are cited as key indicators of performance.

Once a user achieves an acceptable response-time level, any degradation in that level is unacceptable. Less sophisticated customers cite disk drive seek time as a performance measurement, even though it is largely meaningless.

Few Advanced Storage Management Users

A minority of users is considered advanced in storage management sophistication. In fact, IDC estimates that less than 25% of all multiuser and network



PCs EAT UP THE DASD TERABYTES
Worldwide Installed DASD by Operating Platform 1986-1996
(Thousands of Terabytes)

Source: International Data Corp.

Although mainframes are declining, storage requirements are not.

Where in the world is high availability going?

Right here!

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Where the World is going!™

You didn't plan on system downtime–or the lost sales, lost productivity and loss of confidence by your clients that led to "bottom-line" losses. Now with AViiON®-based high availability open systems you won't lose sleep over downtime because you'll be enjoying:

- Increased information integrity and storage capacity thanks to our highly available CLARiiON™ disk array system. Its concurrent support for multiple levels of RAID allows the flexibility of performance tuning.
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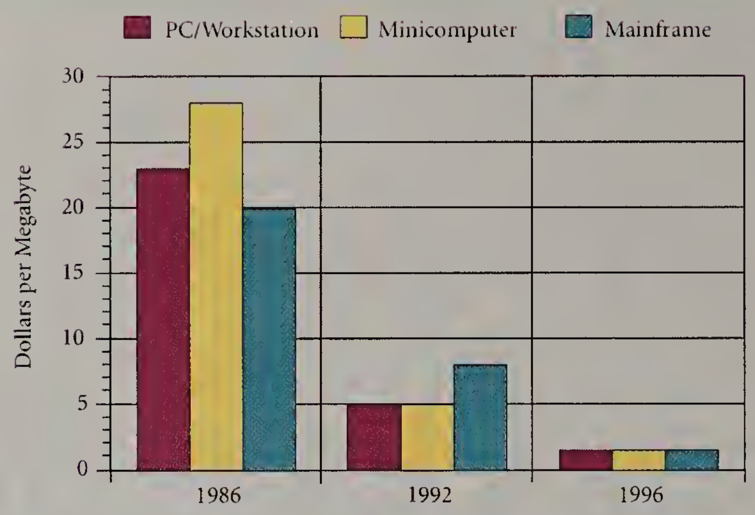

STORAGE PRICES LEVEL OFF
Disk Subsystem Price-per-megabyte Pricing Trends by Platform 1986-1996

Source: International Data Corp.

New storage technology developments are making mass storage affordable and available to mass audiences.

sites effectively utilize storage management software. Effective use of storage management software requires characterizing, cataloging and managing both active and inactive data.

Ultimately, the most effective storage management environment is one where staff programmer productivity is not reduced by the need to manage rapidly growing storage facilities. In reality, most users are cognizant of overall storage management issues but are more focused on solving problems related to backup storage (typically tape drives).

> *IDC research reveals a willingness to trade off certain storage features in order to achieve improved availability.*

DISK CAPACITY AND GROWTH PROFILES

On-line storage growth rates vary dramatically by host site environment. IDC believes installed disk-based gigabyte percentage growth rates for midrange and mainframe systems will begin moderating to around 15% and will not revert to previous highs within the next three years. Conversely, network server and supercomputer installed disk-based gigabyte growth will continue to increase at more than 40% per year.

Installed on-line disk capacity growth is often used as a benchmark of storage industry health. This measurement is also often used by customers to plan DASD expenditures and acquisition strategies. In the early-to-mid '80s, yearly mainframe and minicomputer growth rates of 50%-plus were not uncommon. While some mainframe and mini sites continue to grow above the 20% level, on balance, these segments have slowed dramatically. Network server and supercomputer environments, however, continue to explode at a dramatic pace.

In looking at the projected number of installed disk-based terabytes of storage by operating platform between 1992 and 1996, the following points are noteworthy:

- Total worldwide installed terabytes will grow from 34,700 in 1992 to 134,925 by 1996, almost a fourfold increase
- The total number of terabytes installed on PCs and PC-based servers will surpass the total installed on traditional multiuser systems in 1993
- AS/400 and Unix growth rates will increase up to 20%
- PC-based network server capacities are expected to grow at 40% per year, primarily driven by the rapid attachment of standalone PCs.

STORAGE GROWTH BY HOST AND NETWORK ENVIRONMENTS

Network server sites (primarily Novell-based) show dramatic potential and will continue to grow at rates significantly higher than the industry average. The primary reason for this growth is the rapid pace at which standalone PCs are being networked. IDC's Global IT Survey shows that more than 60% of installed PCs are currently connected to LANs, and that nearly 70% will be connected within the next year. The local hard disk capacity installed on LAN-attached PCs does not affect the amount of central disk capacity.

Minicomputer sites are expected to show installed disk-based gigabyte growth rates of roughly 17% over the next year. IDC expects this slower growth trend to continue as users shift investments toward smaller networked platforms. Nonetheless, minicomputer sites will add capacity to existing systems while investing in new CPUs and peripherals.

Unix, Hewlett-Packard's MPE, IBM's OS/400 and potentially Digital Equipment's Alpha are expected to outpace the growth of other minicomputer operating systems. Growth at these sites — which is less than comparable growth at network server sites — is driven by increased user demands and subsequent new applications.

Mainframe growth rates in the early '80s were boosted by a demand for IBM's 3380 line of disk drives. IBM hopes to regain that boost in the '90s by positioning the mainframe as the primary image processing server platform. If the now-staggering giant succeeds in this initiative, mainframe storage requirements would increase dramatically. To date, however, budgetary constraints and a lack of software have curtailed user investments in imaging.

Until mainframes are embraced by imaging or some other application that consumes large quantities of storage, IS departments will continue to optimize their use of existing DASD. In this uncertain environment, many customers are opting for lower-capacity used DASD, which contributes to keeping the installed gigabyte growth rate below 20% yearly.

Supercomputer storage requirements continue to escalate, driven primarily by the availability of ever-larger and more complex computational problems. IDC's research covers a mix of large supercomputer sites, most of which are dominated by Cray. A significant number of smaller sites are primarily Convex-based. The average combined installed capacities at sites dominated by both of these companies is approaching 50G bytes, and DASD growth at both sites is likely to continue at well above the industry average.

WHAT IS RAID AND WHERE DOES IT FIT?

RAID is an acronym for Redundant Arrays of Independent (or Inexpensive) Disks. Currently, through a combination of formal definitions and informal industry consensus, there are six levels of RAID — zero through five. Each RAID level, except Level 0, reflects a different design architecture while sharing three defining themes:

- RAID is a set of physical disk drives viewed by the operating system as a single, logical drive
- Data is distributed across corresponding physical drives of an array
- Redundant disk capacity is used to store parity information, which guarantees data recoverability in case of a disk failure.

The second and third themes are variable according to each RAID level, and have the biggest impact on disk array performance.

The term RAID was originally described at the University of California at Berkeley in a paper that outlines various RAID configurations and applications. RAID was conceived in an effort to close the widening gap between CPU processing speeds and relatively slow electromechanical disk drives. The intention was to replace a large capacity disk drive with multiple smaller capacity devices and then to "stripe" data across the smaller drives. RAID's method of striping data is unique. In theory, striping provides simultaneous access to data from multiple drives, thereby improving I/O performance and allowing easier incremental increases in capacity. In practice, however, writing parity information can reduce overall subsystem performance.

RAID researchers realized that by allowing multiple heads and actuators to operate simultaneously, higher I/O and transfer rates could be achieved. They also realized that as the number of devices within a subsystem increases, the probability of a device failure is more likely. To compensate for increased drive failure rates and decreased subsystem reliability, the notion of storing parity information was introduced.

PARITY: THE FIRST STEP TOWARD FAULT-TOLERANT DISKS

RAID uses parity information to secure data in the event of a failure. Parity data is created by calculating a logical exclusive-OR (XOR) on actual user data and storing the result on disk. The space used to store this parity information is unavailable for user data. The parity information can be used to rebuild data in the event that a device (or sector) becomes unreadable.

For example, if an array contains a group of five drives, the logical equivalent of four drives is used to store data, and one drive is used to store parity. User data from the first sector of each of the first four drives is XORed, creating parity data stored on the first sector of the fifth drive. This operation is conducted on all user data in an array. In the event of a single disk failure, the lost data can be regenerated from the data on the four remaining drives.

TOP USER STORAGE REQUIREMENTS: CAPACITY AND RELIABILITY

Storage Availability, Performance and Management Requirements Across Platforms

Site/Category	PC Servers	Minis	Mainframes	Supercomputers
Need 7x24x52 Availability	45%	53%	57%	Neg L.
Need Availability Over Performance	62%	63%	65%	45%
Need Performance Over Availability	38%	37%	35%	55%
Most Pressing Storage Problems	Capacity/$ Reliability	Capacity/$ Reliability	Capacity/$ Reliability	Capacity/$ Reliability
Storage Management Focus	Automate Backup	Automate Backup	Cost & Performance	Capacity & Performance Management

% of Sites

Source: International Data Corp.

In addition to wanting increased storage capacity and reliability, more and more users are also calling for round-the-clock data availability.

RAIDIΩN®

Fault-Tolerant Disk Arrays

MICROPOLIS
RAIDIΩN
Novell Labs Tested & Approved

The Word Is Getting Around.

"We've evaluated many RAID products over the past six months, and from what we've seen, Micropolis' RAIDION is probably the most modular RAID 5 scheme now on the market."

June, 1992 **NETWORK COMPUTING**

"It was a breeze to integrate and didn't add any overhead to installation time… Micropolis has done an excellent job on a great product."

May 25, 1992 **LAN TIMES**

"The Raidion array had the most thorough documentation of the tested drives. The Raidion software was the most robust, as well."

June, 1992 **LAN**

"PC Week Labs found that the array performed admirably - successfully backing up data and easily restoring it upon drive failure."

May 25, 1992 **PC WEEK**

"The Raidion's low price alone makes it worth considering."

August, 1992 **BYTE**

Take it from the industry's leading publications: when it comes to reliable, cost-effective, fault-tolerant storage, there isn't another disk array subsystem like RAIDION.

RAIDION's, module-by-module expandability allows the array to be configured to the exact capacity you need, with the flexibility to increase capacity in the future. For example, a three-module RAID level 5 array can be expanded up to 32 modules with a total capacity of 65 Gigabytes.

That's why thousands of RAIDION storage modules are now in use worldwide - wherever users demand the unsurpassed reliability of fault-tolerant data storage - and why we've become the world's leading supplier of fault-tolerant disk arrays for networks running Novell NetWare™ 3.11.

Put RAIDION to your test. For further information or the name of your nearest Micropolis Authorized RAIDION Distributor, call: 1-800-395-3748.

LAN TIMES
READERS
CHOICE
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AND
NetWorld

Core Disk Technology Trends

Prior to exploring user requirements for disk subsystems, it is useful to understand the fundamental reasons for changes in the storage business. The most significant signal of change is disk price per megabyte by platform. This is reached by plotting the street price per megabyte for a configured disk subsystem by platform (PC/workstation, minicomputer, mainframe) over time.

The following points are of particular interest:

- In 1986, mainframe disks provided the lowest price per megabyte, and minicomputer devices, the highest
- By 1992, mainframe disks had become the most expensive while minicomputer and PC subsystems were about equal
- Mainframe disk prices will decrease, becoming nearly the same as those of minis and PCs.

These trends are typically credited to open systems interfaces such as SCSI, alternative distribution channels for disk drives and increased competition. While these factors tend to decrease subsystem prices, the root cause is increasing disk areal density. Disk areal density is the number of bits stored on a specified space.

Almost 70% of the cost of a disk subsystem is attributed to the disk drives. The controller, fans, power supplies and "skins" will continue to constitute less than 35% of disk subsystem value. A disk subsystem's cost and subsequent pricing will be determined by the amount of data that can be stored on a disk platter.

IDC constantly monitors the capacities per platter for disk drives of varying form factors. This research shows that disk areal densities continue to double every 18 months as they have been doing since 1980. In the near future, they may begin doubling every 15 months as technologies like magneto-resistive heads, glass media and advanced read channels achieve higher popularity. These advanced technologies are no longer available only to IBM mainframe customers.

As a result of these storage technology improvements, IDC believes the following products will be in production and widely available to users by 1996:

- Single-platter 3.5" 1G byte Winchesters priced below $300
- Dual-platter 2.5" 1G byte devices priced below $500
- Four-platter 1.8" 1G byte disk drives priced below $800.

The introduction of these products will dramatically alter the storage marketplace because of their low costs, condensed size and voluminous storage capabilities.

These types of devices, for example, could lead to $15,000 disk subsystems containing dozens of gigabytes of storage in a device the size of a laptop computer. Although industry participants frequently debate the merits of optical storage, flash memories and other alternative storage architectures, magnetic disks are likely to remain the most cost-effective and dominant form of on-line storage well into the next century.

Generating parity works effectively. Because any one group of drives contains the XOR notations of all the other units in the group, lost data can be reconstructed by XORing all the remaining devices in the set. Once a failed disk device is fixed or replaced, the data can be reconstructed and written to the replacement unit.

There are, however, several problems and challenges related to generating parity:

- In order to initiate a full recovery and return to protected mode, an operation (either manual or automatic) is needed to replace failed disk devices. This can be costly and complex.
- Updates to data (writes) are overhead-intensive and may negatively impact performance in many RAID configurations.
- Storing parity information consumes disk space and will add to costs.

Ultimately, these problems can be minimized through a variety of techniques and architectural alternatives.

At the most basic level, RAID falls into the category of large capacity storage subsystems. RAID storage subsystems should be viewed by the user as virtual DASD. If a RAID subsystem is built with all essential levels of redundancy, it becomes fault tolerant virtual DASD.

Although originally conceived as a performance enabler, RAID is typically applied commercially as a high availability subsystem. The different levels of RAID technology provide redundancy through various combinations of parity information and data mirroring across drives. Of the six RAID levels that have been defined, only four appear to have a chance of achieving broad industry acceptance: RAID Levels 0, 1, 3 and 5.

RAID Level 0

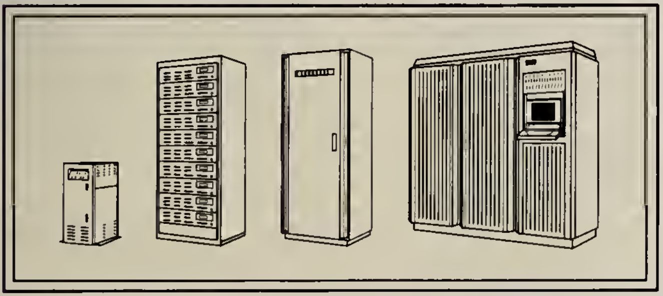
RAID Level 0 transfers data across an array of disk drives in parallel. This technique has been used for years in various commercial and technical computing environments. Spreading the data over multiple drives allows simultaneous read and write operations, and can result in performance increases. RAID

If your data is mission critical, it's critical you read this ad.

There's one little word that can strike terror into the hearts and minds of Information Services professionals everywhere: downtime. But thanks to the new Symmetrix 5500 from EMC, it's one word you can virtually banish from your vocabulary.

You see, the Symmetrix 5500 ICDA™ is designed with redundant hardware components, proactive maintenance features, a full mirroring option and the ability to repair or upgrade the system with no loss of uptime. In short, Symmetrix 5500 brings continuous operation to mission critical sites that need access to data 24 hours a day, seven days a week.

Symmetrix 5500/IBM Mainframe Compatible Storage



The Symmetrix 5500 is part of an entire line of disk storage systems based on EMC's Integrated Cached Disk Arrays (ICDA™).

And because it's based on EMC's proprietary Integrated Cached Disk Arrays (ICDA™) technology, there's simply no faster way to access data on an IBM or compatible mainframe computer. The Symmetrix 5500 also brings all the features of the Symmetrix Series to mission critical environments: a small footprint, low power and cooling requirements and a two year warranty that add up to reduced cost of ownership and a maximum return on your storage investment.

Downtime can cost your business over $100,000 a day. So, if your data is mission critical, make it your mission to learn more by calling 1-800-424-EMC2, extension LM67C.

EMC²
THE STORAGE ARCHITECTS

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Level 0 does not write parity information and is therefore exposed to increased failure rates.

Availability characteristics depend largely on the number of disk devices used to achieve desired capacities. In general, RAID Level 0 provides protection levels slightly below conventional disk systems and well below other RAID levels

Advantages:
- High I/O rates are achievable, especially with small I/O request sizes
- Appears to the host as a single logical device for easier storage management
- Use of multiple disk actuators allows higher transaction rates.

Disadvantage:
- Drive failures result in unrecoverable errors.

RAID Level 1

RAID Level 1, commonly referred to as "mirroring," "dual-copy" or "shadowing," has been available commercially in mainframe and minicomputer environments for years. RAID Level 1 makes an exact copy of the contents of one disk drive on another. In the event of a drive failure, the second drive is accessed for the desired data. While mirroring is typically used to improve data availability, some users actually employ the technique to improve overall subsystem performance.

The main drawback to this level is its cost. The cost of mirroring is very high because twice the normal disk capacity is needed. Even though its expense has limited the use of RAID Level 1, this level is still the most popular form of RAID because it is so effective in mission-critical environments. And RAID Level 1 will remain the most popular form of RAID for at least the next two years. While RAID Level 1 demonstrates good performance characteristics, it also remains difficult to cost-justify.

Advantages:
- Copy operations are conducted transparently
- High levels of data availability
- High I/O rates
- Backs up nearly-current data sets.

Disadvantages:
- Requires twice the disk space
- High cost.

RAID Level 3

Like RAID Level 0, RAID Level 3 transfers data in parallel. RAID Level 3, however, generates parity information and stores it on a dedicated device. RAID Level 3 also uses synchronized spindles and parallel data paths. In the event of a drive failure, the parity drive is accessed and data is reconstructed from the remaining devices. Once the failed drive is replaced, the missing data can be restored on the new drive and the subsystem can resume in "protected" mode.

Because data is striped at the bit or byte level, and only one I/O operation can be executed at a time, RAID Level 3 is most useful in applications that require the transfer of large amounts of information quickly, such as imaging and CAD/CAM.

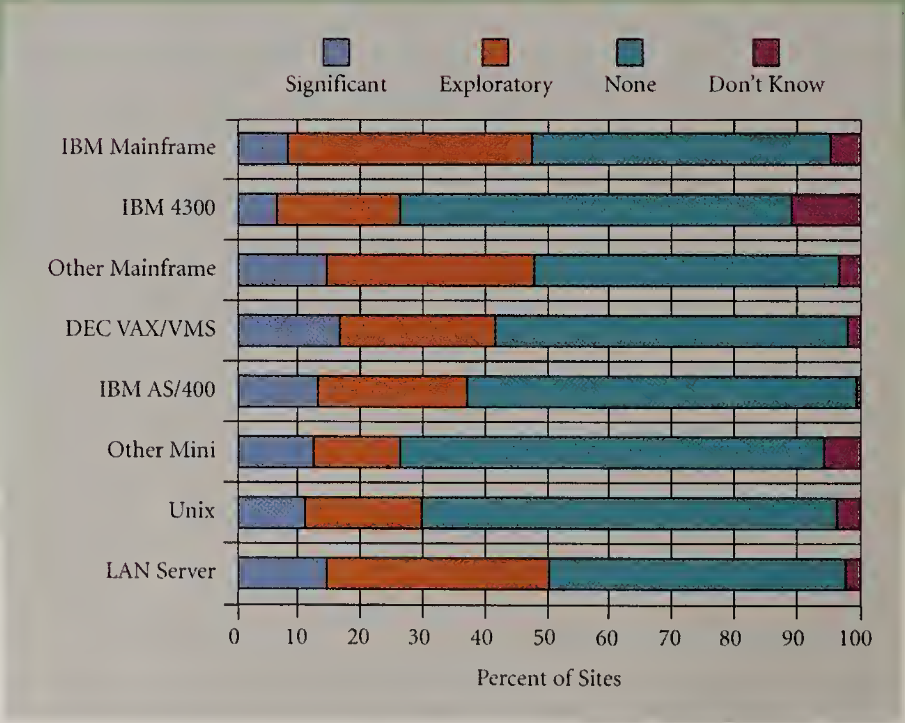
Advantages:
- Capacity overhead for parity is much less than with mirroring, and costs less
- High bandwidth capability and good throughput for large request sizes
- Excellent read and write performance.

Disadvantages:
- Poor performance in transaction environments
- Use in small request size environments results in wasted disk space.

RAID Level 5

RAID Level 5 is rapidly becoming the most popular RAID level after Level 1. It is most applicable in commercial transaction environments where minicomputers and network server platforms are found. Unlike RAID Level 3, however, RAID Level 5 reads and writes data to separate disks independently and allows simultaneous read and write operations to occur. The result is an architecture that is optimized for high I/O rates.

POTENTIAL RAID USERS SPAN THE IS SPECTRUM
Projected RAID Use Over the Next Year



Source: International Data Corp.

Judging from IDC's survey results, both mainframes and LAN Servers are strong future candidates for RAID technology.

8:34 am

"Six urgent messages on my desk. Looks like the AS/400 took a hit last night. Beautiful…

9:16 am

...Accounting wants to know when the system will be up...

10:00 am

...We've lost some data...was it a disk or controller?...I don't know, we're checking on it, I'll have to get back to you...

10:30 am

...call and tell them we're doing the restore as fast as we can, these things take time, somebody get Carl down here...

11:08 am

...CEO's calling, wants to discuss 'our little downtime problems'—now...better cancel my 12:00...

12:51 pm

...tell Denver I completely understand, but there's just no way to recover that data—has anyone found Carl...

2:17 pm

...Get New Jersey on the phone — sure mirroring would help, but we'd still be exposed—where is Carl?...

4:20 pm

...I know they want it faster...yeah everyone's still down...we're doing the best we can...I'll tell you what we really need...

6:37 pm

Why Depend On DASD For AS/400® Storage? Discover The ALPINE 9600 Storage Manager™ And Protect Against Downtime.

ALPINE provides continuous data availability and a "Mean Time to Data Loss" of more than 9,000 years.

The innovative ALPINE 9600 is here. This unique AS/400 data storage and protection system is more than a mere DASD device. It's a true data storage manager. ALPINE features breakthrough **RAID 5 ARCHITECTURE** to give you complete protection without completely redundant data. ALPINE is efficient. Its **ROTATING PARITY** design allows your highly active data to be spread over many devices for improved throughput without the capacity overhead, single points of failure, and expense of mirroring systems. ALPINE is secure. Its **COMPREHENSIVE FAULT TOLERANT DESIGN** avoids subsystem interruptions and maintains performance even in the event of a failure. Downtime and data loss can be serious problems. But with ALPINE, they are virtually a thing of the past. While everyone else measures their performance in Mean Time Between Failure (MTBF), which can be hours, weeks, or months, we measure our performance in **MEAN TIME TO DATA LOSS (MTDL),** which is over 9,000 years. How is this possible? ALPINE is designed with unique **GLOBALLY SWITCHABLE HOT-SPARE DRIVES** which make sure your data remains available even if a head disk assembly fails. No other AS/400 storage device has this patented technology. ALPINE also features fully

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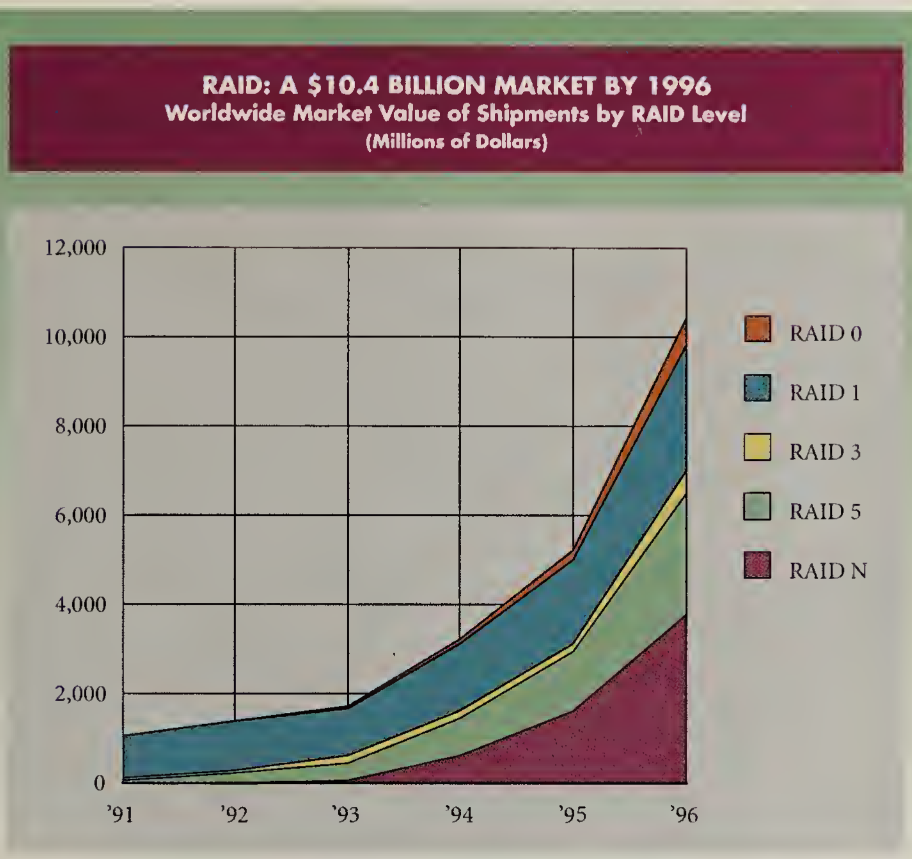

RAID: A $10.4 BILLION MARKET BY 1996
Worldwide Market Value of Shipments by RAID Level
(Millions of Dollars)

Source: International Data Corp.

RAID Levels 0, 1, 3, 5 and N are the most likely to produce significant market revenues over the next three years.

RAID Level 5 stores parity information on all drives, interleaved evenly across all devices. This avoids creating a potential I/O bottleneck at, and contention for, the parity drive.

The major drawback of RAID Level 5 is its tendency to degrade write performance. This is referred to as the "RAID 5 Write Penalty" and is explained below. RAID Level 5 is the most balanced implementation in terms of price, availability and performance. The cost of protection can be significantly less than with mirroring, and availability levels are equal to all other RAID levels. If consistent and predictable performance is a primary criterion, RAID Level 5 can probably be configured to meet most performance needs. However, performance will suffer in update-intensive applications.

Advantages:
- Capacity overhead is lower than with mirroring
- High I/O rates
- Excellent performance for read-intensive operations.

Disadvantages:
- Update performance is degraded
- Architecture is not optimized for high transfer rates
- RAID Level 5 Write Penalty.

The RAID Level 5 Write Penalty

Commonly referred to as the "Read-modify-write cycle," the RAID Level 5 Write Penalty is associated with the need to conduct four operations during a write cycle. RAID Level 5 updates require the following sequence: read old data, read old parity, write new data, write new parity.

While performance also greatly depends on the I/O request size (increased size rapidly degrades transaction rates) and access times, the amount of write activity has the greatest impact on performance due to the read-modify-write cycle.

In addition to the time it takes to conduct four operations, RAID Level 5 write operations incur access-time penalties associated with read-modify-write overhead. In non-RAID Level 5 environments, access times consist of the time it takes to physically access data. Naturally, shorter seeks result in increased transaction levels. In RAID Level 5, only the read component of the read-modify-write sequence is subject to normal I/O request times.

Because a RAID Level 5 write is preceded by a read operation (to read the old data), the access time associated with the write component is primarily a function of rotational latency. This latency period amounts to at least a single disk rotation. Mechanical disk rotation is the largest single factor affecting overall transaction performance.

While optimization techniques like seek-reordering can be used to improve access times, their benefits are all but negated in RAID Level 5 write situations. Generally, the performance of non-cached RAID subsystems is determined by four factors:
- Read/write mix
- Amount of data transferred per each disk access
- Seek command queue depth
- Number of drives in the RAID group configuration.

Of these factors, the intensity of write activity has the biggest impact on non-cached RAID Level 5 performance. Specifically, the higher the write activity, the greater the performance penalty.

Eventually, the RAID Level 5 Write Penalty will be minimized through a variety of write-caching or write-assist technologies.

RAID Level "N"

RAID Level N generically refers to levels beyond RAID Level 5. While the definitions of these levels is subject to debate, the basic design tenets are not. They are twofold: first provide increased levels of data protection and availability; second, reduce or eliminate the RAID Level 5 Write Penalty.

Additional characteristics of RAID Level N will include complex and elegant features such as fault tolerance at all levels for drives, controllers, cache

Some promise RAID...

RAID 1
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RAID 5
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RAID 5
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RAID Myths and Realities

MYTH: RAID will take over the market tomorrow.

REALITY: For the next 18 months, a pervasive lack of knowledge about RAID technology will prevent it from expanding beyond an important niche market. Today, only supercomputer sites committed significant resources to RAID.

MYTH: Advanced levels 3, 5 and N of RAID will immediately replace RAID Level 1 mirroring capabilities.

REALITY: Many users like mirroring — which involves creating backup by copying the contents of one disk onto another — and are willing to pay its high price in order to realize its utility. Mirroring remains the dominant RAID technology today and its popularity will continue to grow for the next two years.

MYTH: RAID always improves performance.

REALITY: RAID relies on redundancy for fault tolerance, often lowering system performance in terms of capacity and access time. Capacity is reduced because disk space must be used to store redundant data. Access time is increased because extra disk seeks are required to access and update redundant data. In most cases, benchmarks show RAID system performance lags behind non-RAID system performance.

MYTH: RAID data is never lost.

REALITY: No subsystem is perfect. The reliability levels of RAID vary by product and vendor. For example, some RAID subsystems use data caches to improve write performance. If the cache does not have an independent power source, a power loss could cause data stored in the cache to be lost. Another example: Some RAID products use two levels of parity — another backup technique — so two-drive failures can be absorbed. Others use one level. In either case, improperly configured or functionally deficient RAID products may result in data loss. Still, the primary source of data loss is human error. A fault tolerant disk drive, therefore, does not ensure 100% data protection.

MYTH: RAID provides continuous data availability without customer intervention.

REALITY: It is true that most RAID products remain up during disk failures. However, failures to a single RAID Level 1 controller or host adapter attached to both a data drive and a mirrored drive make data unavailable. Moreover, many RAID products require operator intervention to "heal" failed drives or add storage capacity.

MYTH: RAID eliminates cost and concern related to drive failures.

REALITY: Since it relies on a larger number of smaller drives to store the same amount of data as a single, large, expensive disk, RAID is more likely to suffer disk mechanism failures. Each failure may be less severe since the data is recoverable, but the failures will come at a much more rapid rate, potentially invoking unforeseen service costs.

MYTH: RAID is inexpensive.

REALITY: While the "I" in RAID is often said to stand for "Inexpensive," in reality, RAID is more expensive than conventional disk subsystems because of parity overhead and controller complexity. Today's RAID subsystem prices per megabyte range from 5% to 80% higher than non-RAID subsystems.

MYTH: RAID eliminates the need to back up online data.

REALITY: While many RAID products simplify the backup process and lessen its urgency, RAID is not a replacement for normal backup and archival procedures. In addition to off-site archival and data interchange capabilities, tape remains the best backup. Moreover, adding drives to a RAID system often requires a save/restore procedure as many RAID subsystems need to redistribute parity data onto new devices.

memories, backplanes, fans and power. Moreover, the ability to replace any component while the subsystem is operational will also be developed. For the next several years RAID Level N subsystems will be justifiable only in large systems environments.

RAID Level N has yet to reach volume shipment levels. This is at least partly attributable to its cost, which ranges from 35% to 70% over conventional subsystems. Clearly, RAID Level N must be justified by the need for continuous data availability.

Advantages:

- Capacity overhead is lower than with mirroring
- High I/O rates
- Excellent performance for read- and write-intensive operations .

Disadvantages:

- Increased cost
- Increased complexity.

RAID Software

Various RAID levels can also be achieved via host software. This approach offers lower cost and the ability of using existing disk and controller resources. The drawback is that no one vendor takes responsibility for ensuring total data availability. This can lead to finger pointing if a device or controller failure occurs.

Some RAID software suppliers actually pre-package subsystems (drives, controllers, fans, etc.) to provide a tightly integrated offering that eliminates finger pointing.

Software implementations are viewed as lower-performance alternatives because they use CPU processing power. This software performance degradation can be minimized by allocating unused CPU cycles to process redundant operations.

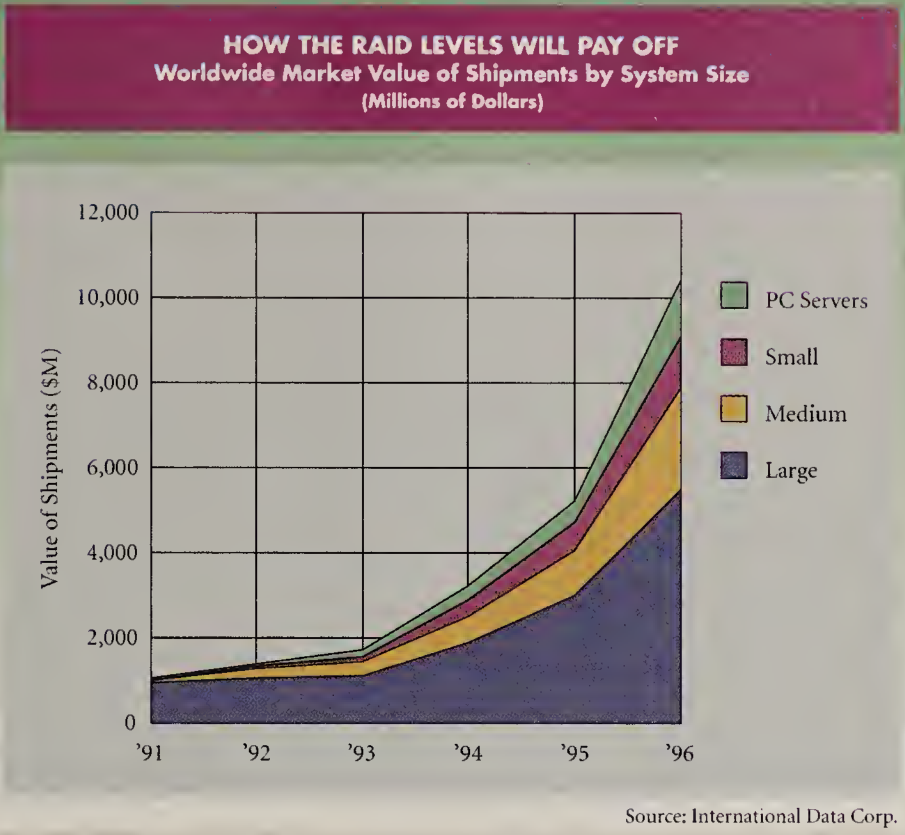
RAID host software is a low cost fault tolerant disk option. Next-generation operating environments like Microsoft's NT and new releases of Novell's NetWare are expected to incorporate host-based RAID software. Despite performance concerns, RAID software can enable customers to employ existing resources toward realizing fault tolerant disks. To the extent that the highest availability and performance are crucial, however, software-based RAID is not the ideal solution.

Advantages:
- Lower costs
- May allow the use of existing I/O hardware.

Disadvantages:
- Not optimized for performance
- Often not pre-packaged and integrated
- May lack fault tolerance.

THE MARKET IMPACT OF RAID

While IDC believes that RAID is largely unsuitable for single-user systems or LAN nodes, awareness and use of RAID is increasing within all classes of host and network systems and servers. In this year's IDC Global IT Survey, respondents were asked to describe their use of RAID over the next 12 months as either "significant," "exploratory" or "none." The following points are based on their responses.
- RAID is perceived as equally applicable in all site environments
- Compared with last year's survey, current RAID awareness and buying intentions are up. This is based on the fact that fewer respondents describe their use of RAID as "none"



HOW THE RAID LEVELS WILL PAY OFF
Worldwide Market Value of Shipments by System Size
(Millions of Dollars)

Source: International Data Corp.

Small and medium RAID systems are slated for rapid growth over the next four years.

- Awareness and intent to buy within the AS/400 base increased dramatically in a year: "Significant" responses doubled to 14%
- LAN sites' expected use of RAID exceeds all other environments based on combined "significant" and "exploratory" responses
- IBM mainframe customers' expected use of RAID decreased. Those citing "significant" dropped from 14% in 1992 to 8% in 1993 due to storage product delays in this market segment.

Although it is not growing rapidly, the worldwide market for disk subsystems attached to multiuser systems and network servers is large. Currently, RAID comprises less than 5% of this business. As more products become available between now and 1996, however, IDC believes that RAID will grow to account for 40% of the market.

CONCLUSION

Conventional disk systems will remain the configuration of choice for the foreseeable future. While non-RAID subsystems will never provide the protection of RAID, many users do not care. Moreover, subsystem designers are finding ways to minimize exposure to failures through techniques like predictive monitoring of devices and caches.

Additionally, many features normally associated with RAID, such as compression, compaction and open data set backup, will find their way into conventional subsystem designs.

Despite ongoing developments in conventional disk technology, RAID offers benefits that simply are not available elsewhere. Mainframe sites that rely on high availability and round-the-clock uptime can realize tremendous productivity increases by implementing RAID. In such high-demand, transaction-oriented environments, RAID technology may be suitable for 70%, 80% or even more of total data.

RAID technology is still maturing, but even at this relatively early point in its lifespan, it provides the critical first step toward high availability: guaranteed disk access.

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How to get 'runaway projects' on track

Experts give advice on preventing a systems development effort from becoming a white elephant

By Mitch Betts

VIRTUALLY EVERY LARGE COMPANY and government agency has an embarrassing "runaway project," an information systems development effort that is way behind schedule and way over budget.

It may be known as the black hole, the white elephant, the Golden Fleece, the boondoggle — or it may be too painful to mention at all. Sometimes, it gets the chief information officer fired.

The latest examples of runaways in the news include AMR Corp.'s joint venture to build the Confirm reservation system for hotels and rental car companies, which led to lawsuits and a $165 million write-off [CW, Oct. 12, 1992]. In addition, the Federal Aviation Administration continues its struggle to finish the much-delayed Advanced Automation System for air traffic controllers.

What follows is a roundup of expert opinions on how to get runaway projects back on track or prevent them from derailing in the first place.

▶ **Jim Willbern, national director of the 10-year-old Runaway Systems Management practice at KPMG Peat Marwick in Dallas.**

"One of the interesting characteristics of runaway projects is that they are usually the largest projects ever undertaken by the IS organization or the vendor involved. People figure they can handle the technology, but they don't realize it's not a technology problem, it's a management problem. Most organizations just don't have the project-management expertise to take it on.

"We try to get organizations to do an assessment, a reality check of where the project is. That slows the project down a little bit, but it only takes one to two weeks. We come up with a strategy of how to put the project back on track.

"One alternative is to cancel the project. Most U.S. organizations don't do that, whereas in the UK and Canada, they're more apt to cancel. In the U.S., there is a bigger fear of losing market share or other business benefits [from canceling a strategic information system]. Also, there is a certain amount of ego or face-saving among senior executives; they would rather put more money in a deep hole than cancel the project.

"The alternative that most organizations have taken is to restructure the project. You need to reconfirm what you signed up for and get user buy-in. You need realistic dates, realistic estimates and a pretty good project plan.

"Another way is to take a second look at commercial software packages that could be installed or tailored, rather than custom-designed software.

"Only 30% of the calls we get are what I would call preventive or proactive, and only 10% of those are from CIOs. Preventive measures include getting users to be sponsors of the project, good planning and installing a change management system, an issue tracking system and a status reporting system.

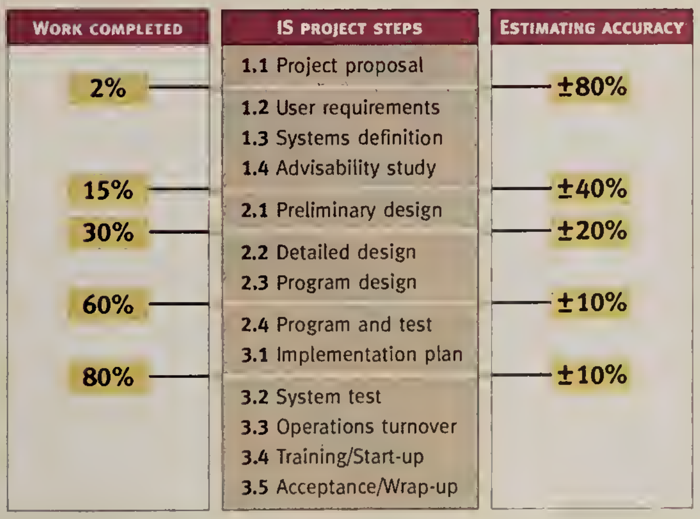
"We also have an early-warning diagnostic system that gives IS managers a reading of their vulnerabilities so they don't get just the happy news. With the Confirm project, they could have used something like this to buffer the happy news they were getting all of the time."

▶ **Albert L. Lederer, chairman of the Department of Decision and Information Sciences at Oakland University in Rochester, Mich.**

"Corporate politics plays a huge role in runaway projects because of the pressure to come up with acceptable estimates and schedules to get project funding. We're not very good at estimating in the first place, so it's easy for systems developers to underestimate the cost. That lowball figure sells the project to upper management, but the project turns out to be much bigger or different from what we thought it would be.

Trouble from the start

At the outset, the cost estimate for an IS project may be as much as 80% too high or too low because so little is known about the ultimate scope of the project



Source: Spectrum International, Inc.

"Then, it's almost a no-win situation. You want to revise the schedule, but that means publicly admitting you screwed up the schedule in the first place. If you stop the project midstream, you may lose some knowledgeable people. In the past, you would add more people to it, but there isn't much evidence that adding more people to a late project will bring it back.

"A very popular fix is to find parts of the project you can delay so you can still deliver something resembling what you promised. You can also 'crash' the project, which means working overtime to get caught up.

Jim Willbern: *Runaway projects are management problems, not technical problems*

"What is really needed is more responsibility and less finger-pointing. It's easy to blame someone else who did the estimates or the user requirements or the initial design. But you come closer to finishing projects on time and within budget when the people who do the estimates and requirements are the same people who actually build the system. That develops responsibility and continuity."

▶ **Gregory J. Zawacki, president of Spectrum International, Inc., a Pittsburgh firm that offers a systems development methodology and project management tools.**

"Runaway projects can be prevented. I'm positive of that.

"One of the most common problems with runaway projects is that they weren't planned thoroughly at the outset. People did not think of all the things they needed to do, so they actually had a bigger project to start with, but they didn't realize it.

"For example, user training may be omitted or glossed over, when in fact there may be 100 or more users who need training. Another example is documentation, which is often forgotten or thrown together at the end.

"Our methodology has a thorough template of activities that need to be done and included in the estimate. Our estimating process tries to estimate what it really takes to get the job done, not what answer somebody wants to hear.

"At the very beginning, when you probably have done only 2% of the work, coming up with an accurate estimate is almost impossible [see chart]. You don't know enough — you don't even know what the user requirements are — and yet that's when people are asking you for estimates and a schedule.

"Our methodology includes five 'funding points' at different stages in the project's life cycle, where the project manager and sponsor can discuss the status of the project and renegotiate scope, schedule or budget.

"When the project reaches a funding point, and they realize it is bigger than they originally thought, the sponsor has to make a decision. Can I cut the scope? Do I put more resources on it, knowing it will cost more than originally estimated? Or do I sequence it so that I get some of the benefits now and defer some of the benefits?

"If you have to reduce the scope so much that you won't get any benefits, then it makes sense to cancel the project."

▶ **William Marks, president of POC-IT Management Services, Inc., a Santa Monica, Calif., consulting firm specializing in project management.**

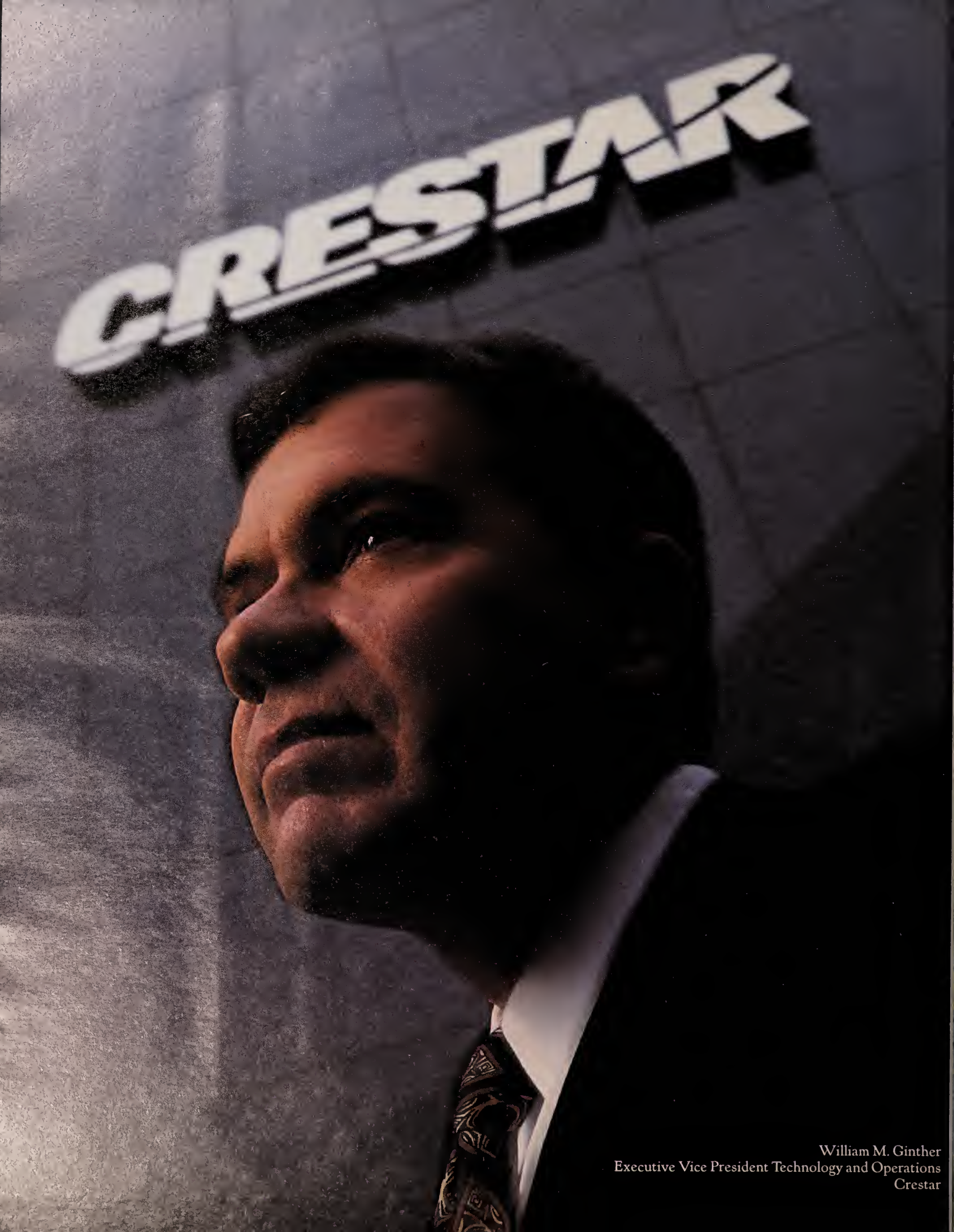
"When a project gets out of control, you should stop and take stock. Make sure you have the sponsorship you originally had or thought you had. Make sure there is a clear understanding of the economics of the project — the costs and the benefits.

"If necessary, go through a rejustification and refunding of the project. Are the powers that be willing to fund it?

"Once you have a good understanding of the costs and benefits and you have a strong sponsor, then you need a sound project plan. That's usually where things have gone wrong in the past. You need detailed estimates of the effort required and clearly defined responsibilities as to who's going to do what. There needs to be full and active participation from all of the key members of the project team.

"You have to track the project very closely, stay on top of the costs and timing of each milestone and stay in close communications with your project sponsor. When you do those things, usually your project gets back under control.

"Of course, if you do those things on the front end, you won't have out-of-control projects."



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Just how do you spell 're-engineering?'

By Garry Ray

You won't find "re-engineering" listed in the Oxford English Dictionary, but Gemini Consulting, Inc. in Morristown, N.J., claims the vaunted reference book is a core component of its Construct re-engineering methodology.

No, the last word on words is not embedded in the consultancy's new BusinessWorks re-engineering software, announced last week. The dictionary is employed by Gemini consultants to help corporate executives craft a "corporate glossary" for the entire company. "If you don't have a common language [to discuss a re-engineering project], you're wasting a lot of time," said Gemini Vice President Steven Patterson.

Having agreed on the company's common vocabulary, the executives next use Gemini's BusinessWorks software to define their fundamental business purpose and overall business objectives.

Then the executives create a companywide "work reference model" (WRM) and "object reference model" (ORM) in BusinessWorks.

To develop the WRM — which includes all of the activities supporting the business purpose and objectives — they add as many as 50 phrases in verb/noun form. Patterson said the WRM might include such fundamental processes as "sell products," "fulfill orders" and "contact customers."

"The only thing we look at is what is being done and why it's being done," Patterson explained.

> "If you don't have a common language . . . you're wasting a lot of time."
>
> *— Steven Patterson Vice President Gemini Consulting*

Because the WRM actually is a representation of the company's business transactions and business rules, Patterson added, "it is important that the terminology be relevant, consistent, accurate and can be defended."

Software dictionary

The terms are then transferred to the ORM portion of Construct. Nouns created in the previous step — such as "product" and "customer" — represent data elements in the ORM and are used to create a source data dictionary for the entire company.

Executives can get an overview of all records, data, transaction types and objects used within the company because these data elements and processes have been captured and organized in the BusinessWorks software.

The end result, Patterson said, is a set of transaction models and data models that can be used throughout the organization. "We're trying to boil all of the activity down to one set of code and processes that can be used across the company," he said.

Analysts said the construct methodology and BusinessWorks software provide more than analysis and prototyping of business processes.

"They've delivered an environment that allows business and software managers to get in a room and understand each other," said John Ryner, vice president of Patricia Seybold Group in Boston.

BusinessWorks, which was jointly developed by Gemini and ParcPlace Systems, Inc. in Sunnyvale, Calif., is an extension of the ParcPlace VisualWorks development environment, company officials said. It is available in conjunction with Gemini consulting services and is not sold separately.

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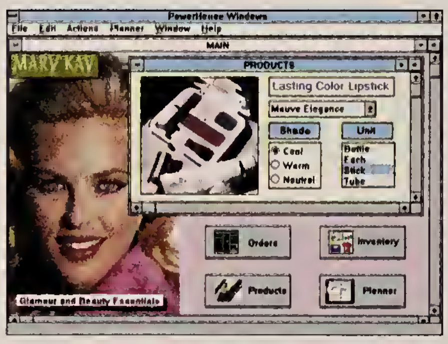
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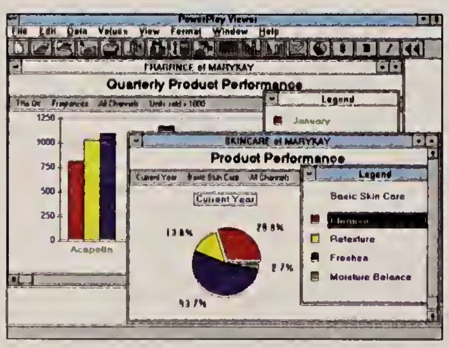
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28.8%
2.7%
53.7%

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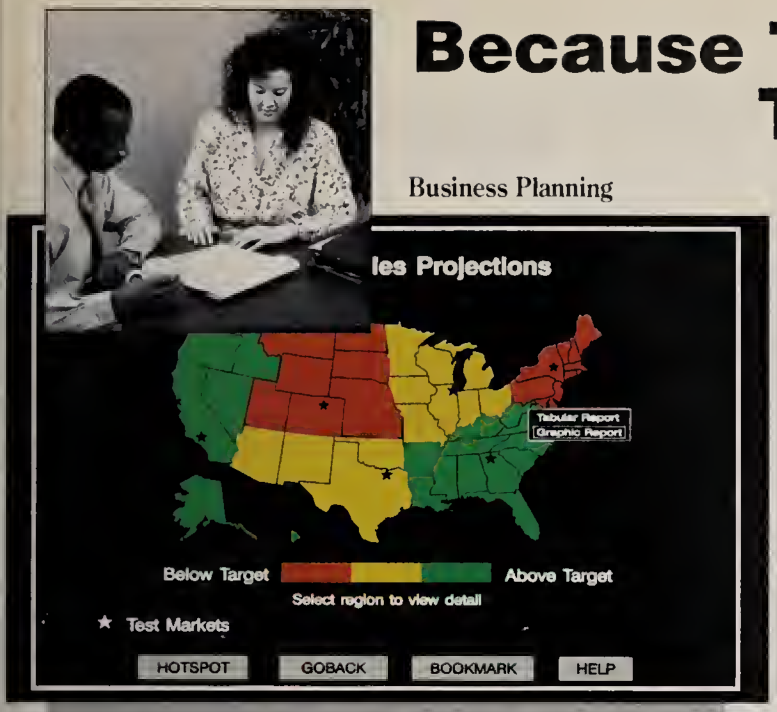
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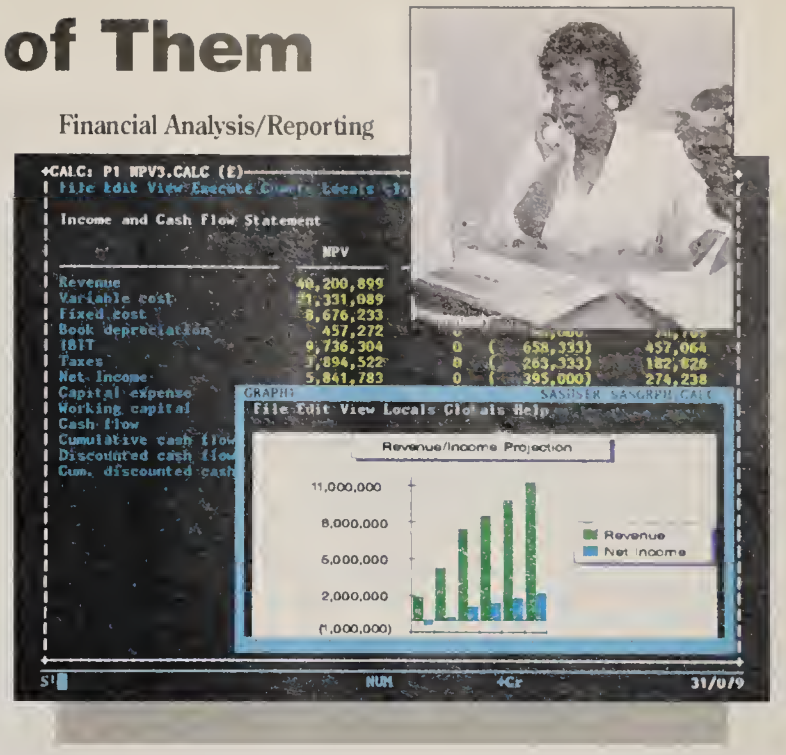
Business Planning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Income and Cash Flow Statement
NPV
Revenue 40,200,899
Variable cost 21,331,089
Fixed cost 8,676,233
Book depreciation 457,272
EBIT 9,736,304 0 (658,333) 457,064
Taxes 3,894,522 0 (263,333) 182,826
Net Income 5,841,783 0 (395,000) 274,238
Capital expense
Working capital
Cash flow
Cumulative cash flow
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Revenue/Income Projection
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Revenue
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Financial Analysis/Reporting

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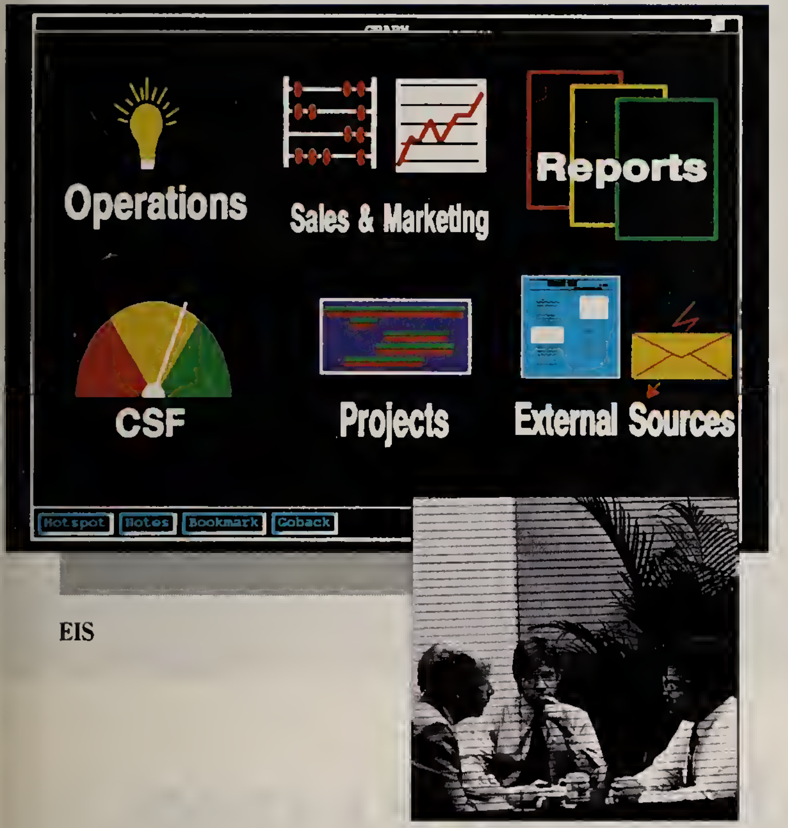
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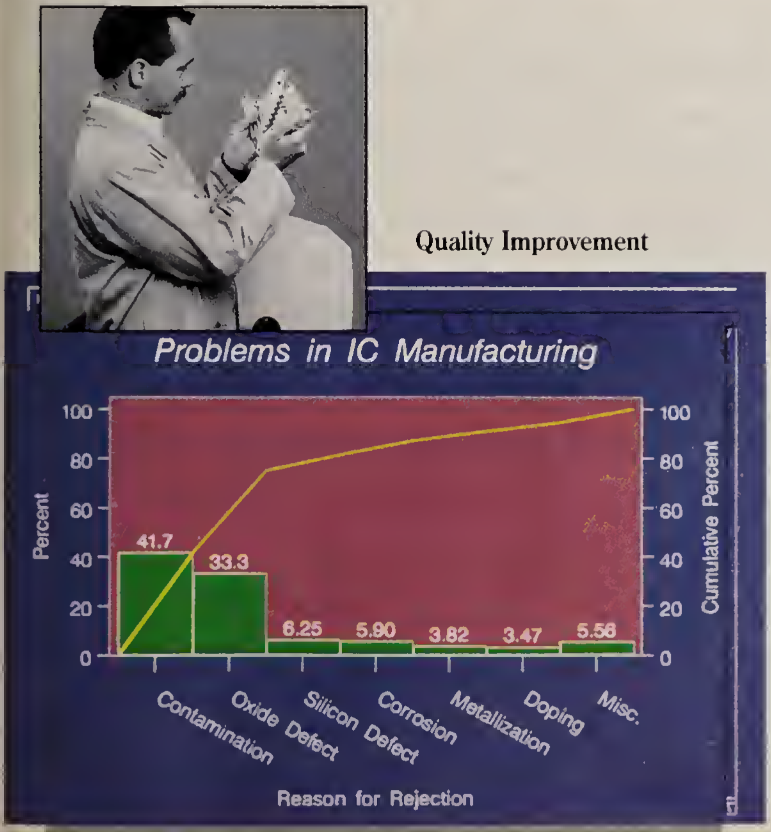

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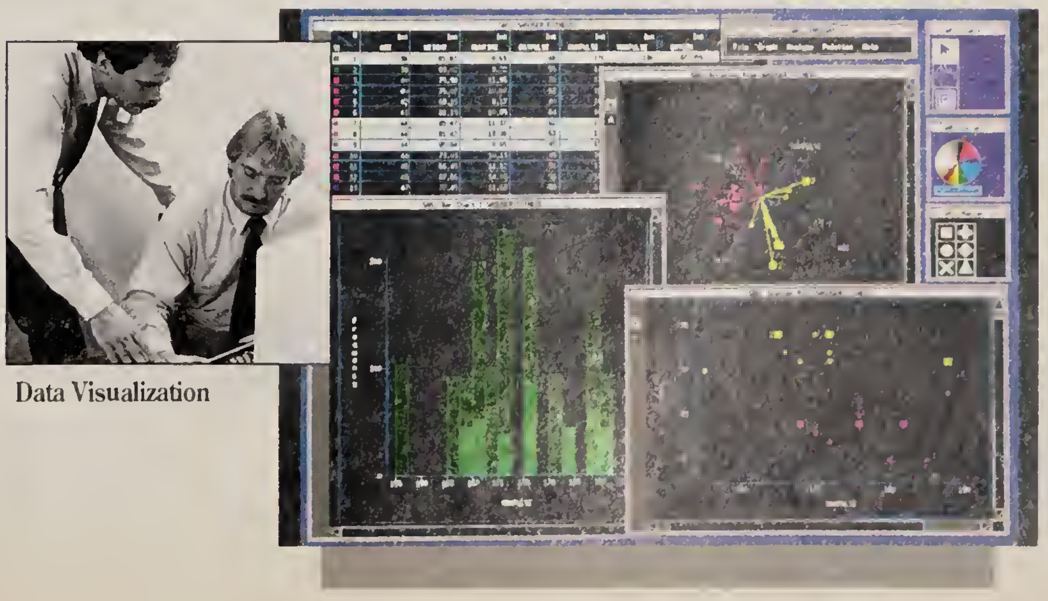

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New Products

Application development tools

BKS Software, Inc. has introduced Version 2.0 of Poet, an object-oriented database system for C++ application development.

Enhanced capabilities in object locking, event handling and transaction support have been added. According to the company, Poet 2.0 increases user productivity by removing the translation needed when shifting data between file-oriented database systems and object-oriented applications based on the relational model. Code is reusable, extendable and maintainable because applications stay object-oriented.

Prices for Poet 2.0 start at $2,700.

▶*BKS Software*
Suite 2200
1 Kendall Square
Cambridge, Mass. 02139
(617) 621-7047

Tritus, Inc. has announced Version 1.2 of Tritus SPF, a style editor that supports OS/2 and DOS.

The product is a PC version of IBM's mainframe-based ISPF/PDF 3.3. According to the company, mainframe users can work with the same keystrokes and commands found on the mainframe editor while using the PC.

Features for Tritus SPF include modifiable panels, custom fonts, edit scroll fields, multiple logical terminals and a complete keyboard mapping ability, among others. DOS or OS/2 and a minimum of 2M bytes of memory are required.

Tritus SPF 1.2 costs $345.

▶*Tritus*
Suite 120
6034 W. Courtyard Drive
Austin, Texas 78730
(512) 794-5800

XVT Software, Inc. has announced Release 1.0 of the XVT-Design++, a software package that provides a complete graphical user interface (GUI) tool for creating C++ applications.

According to the company, the package comprises two components: a C++ application framework with graphical user objects and an interactive design tool for user interfaces that incorporates a C++ code fragment editor. The XVT++ Application Framework and the XVT Portability Toolkit are included.

The XVT-Design++ costs $1,395 for Intel Corp.'s I486 and similar systems and $3,095 for workstations.

▶*XVT Software*
4900 Pearl East Circle
Boulder, Colo. 80308
(303) 443-4223

Pure Software, Inc. has announced Purify 2, an error detection tool.

According to the company, the product was designed to improve software reliability by getting rid of runtime memory errors, memory leaks and memory access errors.

Purify 2 detects runtime errors in C and C++ Unix applications. An incremental linker for rapid turnaround and mail mode for remote error reporting are included.

Purify 2 costs $4,000.

▶*Pure Software*
1309 S. Mary Ave.
Sunnyvale, Calif. 94087
(408) 720-16000

Silicon Valley Software has introduced EasyDBG, a visual, interactive debugger.

The product was designed for the company's SVS ANSI C, 386/486 SVS Fortran-77 and SVS Pascal language systems.

Features include a pull-down menued interface, single-key command operations and extensive on-line Help. Users can also customize the EasyDBG interface.

The product's full-screen display simultaneously shows variables, source and optionally disassembled object code while the application's output is sustained on a separate virtual screen, the company said.

EasyDBG runs as a true 32-bit application and is DOS protected-mode interfaced for Microsoft Corp.'s Windows, DOS and OS/2.

EasyDBG costs $195.

▶*Silicon Valley Software*
Suite 100
1710 South Amphlett Blvd.
San Mateo, Calif. 94402
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RETHINKING RE-ENGINEERING

The idea is still hot, but companies are discovering it's tricky – and risky – to rip up business processes. High failure rates give rise to a new, more cautious trend: 'Re-engineering Lite.'

COMPUTERWORLD SPECIAL REPORT

NICK KELSH

▲ **Elf Atochem's Robert Rubin:** *His company's recent projects aren't huge but still have big impact*

By Rosemary Cafasso

When consultant Michael Hammer challenged businesses three years ago to reinvent themselves, he might as well have set a lit match to a haystack.

Interest in business process re-engineering and its variants roared across industry. Notable early successes, including Ford Motor Co. and Hallmark Co., only fanned the flames, as did articles in *BusinessWeek* and other publications.

Today, observes George Sekely, president of CSX Technology, Inc., the information systems arm of transportation giant CSX Corp., re-engineering remains "this season's Holy Grail."

Indeed, several recent polls show that 70% or more of large U.S. companies claim to be re-engineering. The market has also attracted hundreds of experts for hire, ranging from giants such as Andersen Consulting to tiny, one-person consultancies.

Despite broad interest, the original concept — wholesale and widespread detonation and reinventing of business processes — has yet to become the success many had expected.

Computerworld interviews with nearly two dozen top IS executives and consultants, plus an exclusive survey of the nation's leading technology users (see charts beginning on facing page), reveal that re-engineering still has wide appeal but is much harder to implement than many expect.

Early fruits

The poll of IS executives at *Computerworld Premier 100* companies found that nearly half of the organizations re-engineering say they are enjoying greater productivity, lower expenses, higher profitability or other benefits.

But many are starting small or scaling back projects, consultants say, after encountering the huge challenges that characterize full-blown re-engineering. Only one in four firms involved in re-engineering projects is tackling total, large-scale redesign, our survey found.

True, a half-dozen companies polled reported megaprojects with budgets exceeding $100 million. But most respondents say they are doing pilot projects that involve fewer than 30 people and less than $1 million in funding.

"We don't want to re-engineer the whole world in one shot," explains Tom Loane, vice president of information services at Alamo Rent A Car, Inc., where several re-engineering projects are under way.

His thinking is typical of the new, more modest approach, which might be termed "re-engineering lite."

"We do projects in segments," Loane says, "each of which has a deliverable benefit at the end of it." While the projects aren't reinventing Alamo's business, they will substantially boost customer service, Loane says.

The bottom line is that classic, big-bang re-engineering is not shaping up as *the* business strategy for every company. While no one interviewed said the concept is a failure, re-engineering has become an option for a narrower field of companies. One likely reason, consultants say, is that huge projects are very tough.

Goals often unmet

Even re-engineering's biggest boosters say the chances for failure are better than those for success.

CSC Index, Inc., a Cambridge, Mass., consultancy credited, along with Hammer, as the concept's originator and best-known cheerleader, recently said nearly three-fourths of re-engineering projects would fall short of expectations.

In a report co-authored by Hammer and published late last year, CSC Index said almost one-fourth of 300 re-engineering projects in North America were not meeting their goals. The authors, however, speculated that the failure rate is more likely "on the order of 70%."

Many say the figure is even higher. "I would say it's probably 80% to 90%," says Robert Rubin, vice president at Elf Atochem North America, Inc., a Philadelphia chemical producer, and president-elect of the Society for Information Management.

Mark Klein, a senior vice president at Gateway Management Consulting, estimates that only 5% of re-engineering projects will meet their original goals. "If you are talking about the 80% reductions and tenfold increases," he adds, "even 5% may be generous."

CSC Index uses a narrow definition of failure that includes any project "either completely abandoned or changed for something more incremental," says Bradford Power, a CSC Index consultant who directs Index Quantum, an advisory service on re-engineering.

> **"Re-engineering is the fundamental rethinking and radical redesign of an entire business system — the business processes, jobs, organizational structures, management systems and values and beliefs — to achieve dramatic improvements in critical measures of performance."**
>
> **MICHAEL HAMMER**
> **HAMMER AND CO.;**
> **JAMES CHAMPNY**
> **CSC INDEX**

Despite that tough standard, there's general agreement that the number of bona fide re-engineering successes to date is relatively small. Power estimates the figure is "somewhere in the couple of dozen to 50 range."

What's more, CSC Index says the number of people tackling re-engineering is probably overstated. In late 1992, CSC Index published a poll showing that 72% of 407 respondents had a "major and formal process improvement" under way.

But CSC Index Vice President Steven Stanton calls the figure a "garbage" number. "I am talking about really big and fast change," he says. "Most organizations feel the need, but I don't think 70% are doing it."

What's the problem?

While reasons differ from firm to firm, consultants say many big re-engineering efforts fall short because the concept is so hard to implement. Experts say the biggest challenges include the following:

Corporate resistance. Experts cite a formidable array of "soft" issues as the biggest roadblock to re-engineering success.

Among other things, the endeavor demands executive-level commitment, ongoing involvement by high-level personnel, highly effective communication and the courage to face tremendous change in work habits. Companies must also accept a new definition of corporate culture, often preempting one that has been in place for decades or longer.

"People are talking a good story," says Roger Burlton, national director of information technology at SRI Strategic Resources, Inc., a consultancy in Bernaby, British Columbia. "But when I see them at conferences, I often see issues like internal politics, hierarchies and incredible issues on change management. This is scaring the heck out of people."

Unrealistic expectations. More fundamentally, IS managers and consultants say high hopes can also be a project killer. "[If] you think there

Re-engineering, *page 104*

Buzzword buzzings

"[Re-engineering] is a 30,000-ft word, and it doesn't have a good definition. We've done some things . . . before the word re-engineering came out that were, in essence, re-engineering." —*Robert Hecht, vice president of investment systems, Prudential Investment Corp.*

"Re-engineering is for [companies] that have concluded that evolution won't get them there — whether it is digging out of a ditch or getting to the next mountain. Either way, they need a quantum leap." —*Rudy Puryear, managing partner, Andersen Consulting*

"One way to judge if you are re-engineering: The first time you bring it up, if no one screams, 'Are you crazy?' then it is not a re-engineering project." —*Robert Rubin, vice president of information services, Elf Atochem North America, Inc.*

"Pick up a consultants directory and try to find a firm that doesn't say they work with re-engineering. Everybody wants to apply it to what they are doing . . . to seem in tune with the times." —*Mark Klein, senior vice president, Gateway Management Consulting*

"It is absolutely necessary that we continually improve. Don't make a big deal out of it." —*George Sekely, president, CSX Technology*

"If you do not have a snake oil to sell, you will have a tough time making a buck. If every solution for the world of information systems was implemented that was going to save us $50 million, we'd only be spending about a buck on IS today." —*Tom Loane, vice president, information services, Alamo Rent A Car, Inc.*

"There is always a current seduction, and everyone wants to get on the bandwagon." —*Erwin Martinez, principal, CSC Partners*

"This is the CASE of the '90s." —*Roger Burlton, national director of information technology, SRI Strategic Resources, Inc.*

"A lot of what is being cast as re-engineering would have been called operations improvement two years ago." —*John Demetra, principal, Deloitte & Touche*

MODEST PROJECTS PREDOMINATE

Most say they are re-engineering . . .

BASED ON THE CLASSIC DEFINITION, ARE YOU RE-ENGINEERING ANY PART OF YOUR BUSINESS?

PERCENT OF RESPONDENTS (BASE: 100)

YES	NO
72%	28%

. . . but only one in four is attempting a total redesign.

LEVEL OF RE-ENGINEERING

NUMBER OF RESPONDENTS (BASE: 72)

1. Simplification: remove steps from a business process	4
2. Simplification/Improvement	5
3. Improvement: add new technology and remove steps	22
4. Improvement/Total redesign	15
5. Total redesign: new process, new technology, new way to accomplish goal	24
6. Don't know	2

Half choose smaller scale projects . . .

HOW WOULD YOU DESCRIBE THE SCOPE OF YOUR PROJECT?

NUMBER OF RESPONDENTS (BASE: 72)

Single process in department	1
Departmental	10
Divisional	23
Enterprisewide	34
Other	3
Don't know	1

. . . with modest funding . . .

COST OF PROJECT?

NUMBER OF RESPONDENTS (BASE: 72)

Less than $500,000	20
$500,000-$1M	8
$1M-$5M	10
$5M-$10M	8
$10M-$50M	10
$50M-$100M	8
More than $100M	6
Other	2

. . . and staffing.

HOW MANY PEOPLE ARE INVOLVED IN IMPLEMENTING THE PROJECT?

NUMBER OF RESPONDENTS (BASE: 72)

Fewer than 10	12
11-30	29
31-50	8
51 or more	20
Don't know	3

METHODOLOGY

Computerworld recently polled 100 of the nation's most effective technology users to get an unbiased look at what they were really doing in the way of re-engineering. Top-ranking IS executives from the 1992 *Computerworld Premier 100* were surveyed by telephone by First Market Research Corp. in Austin, Texas, between Feb. 15 and March 1, 1993.

PAYOFFS TANTALIZE BUT TOUGH TO NAIL DOWN

So far, IS is pleased . . .

IS THE PROJECT MEETING YOUR EXPECTATIONS?

NUMBER OF RESPONDENTS (BASE: 72)

Yes	56
No	4
Don't know	12

. . . as early results seem promising.

PLEASE SPECIFY BENEFITS:

NUMBER OF RESPONSES (BASE: 123)

Productivity boosts	27
Overall expenses reduced	27
Profit boosts	22
Staff reduction	21
Revenue boost	14
Market share increases	12

Nearly one in three firms cannot yet gauge payoffs . . .

CAN YOU CURRENTLY MEASURE BENEFITS FROM THIS PROJECT?

NUMBER OF RESPONDENTS (BASE: 72)

Yes	45
No	25
Don't know	2

. . . no matter who's keeping score.

WHO MEASURES THE BENEFITS?

NUMBER OF RESPONDENTS (BASE: 72)
MULTIPLE RESPONSES ALLOWED

User department executive	31
Corporate officer	30
IS executive	11
Other	11

Re-engineering

CONTINUED FROM PAGE 103

are some silver bullets out there, then you will find yourself disappointed with results," says John Demetra, a principal at Deloitte & Touche. "Some people have taken a few examples as gospel and feel those results are available in every situation."

Hammer, president of Hammer and Co. in Cambridge, Mass., says re-engineering is more like a game of chess than roulette: You lose not because of bad luck but because you don't know the rules. Many firms don't understand everything involved in a "real" re-engineering project, Hammer says.

That's what happened at one consumer goods company that recently aborted a re-engineering project. According to the firm's chief information officer, who requested anonymity, the company did not do its homework. One major mistake, the executive says, was failure to include all 50 profit centers in an evaluation of the best administration system.

Instead, the company studied the processes of only three or four centers and based changes on this sample group. So when it came time to introduce the new process, some centers simply couldn't cope.

The CIO concedes, "[We] totally underestimated the complexity and diversity of the business. You expect some glitches, but you don't expect to find totally different ways of running the business."

Experts say scores of other companies have fallen into the same trap, making it impossible to effectively manage the broad range of issues inherent in re-engineering.

Quiet de-emphasis. Obviously, no company wants to trumpet its fiascos, so many such failures slip by unnoticed. Failures "are never visible because people gradually phase them out," SRI's Burlton says. "The scope gets whittled away. People end up not fighting the politics and taking a safer route. They don't want to lose their jobs."

Elf Atochem's Rubin says he knows how re-engineering projects can wane, even if successful: Last year, Elf Atochem set out to simplify its spending authorization program and installed a small computer system to automate it. "But since we had taken away a lot of the pain, the impetus to go back and clean it up disappeared," he says. Now the project is back on the priority list.

KEN KERBS

Consultant Michael Hammer: *Re-engineering not meant for every company*

Not all projects are so lucky, says Sid Diamond, former Black & Decker Corp. CIO turned consultant. "I have seen projects scaled back or extended because of internal politics or resistance to change factors."

Weak corporate backing. Finally, some projects falter because nervous corporate backers pull out at the first sign of difficulty, says Rudy Puryear, managing partner at the information and technology strategy practice of Andersen Consulting in Chicago.

"Everyone is gung-ho; we are going to put all this full-time talent on it, etc., " Puryear says. "Then, the first time they get a blip in earnings, this falls on their priority lists."

Start small

Little wonder that instead of dynamiting existing processes, as Hammer counsels, many companies prefer to take well-aimed sniper shots.

"You go for the small successes at first," Rubin says. He says he views re-engineering as simplifying the organization step by step.

Many are deciding it's more practical for their companies to first try small pilot projects.

For example, Spalding Sports Worldwide, a Chicopee, Mass., maker of sporting equipment, is reshaping key processes in manageable chunks, according to Bard White, CIO.

Step by step, companies move ahead

UCAR Carbon Co., a maker of carbon and graphite products in Clarkesville, Tenn., is hoping to "reinvent the company" through a series of re-engineering projects.

"This company is over 100 years old," says Bill Wiemels, vice president of U.S. operations. "The [business] ways were appropriate once, but they are not all appropriate today."

Several projects of varying intensity advance the long-term goal of complete transformation. Some efforts call for a total redesign, while others focus mainly on restructuring management.

UCAR Carbon has already enjoyed some early success. A recent overhaul of ordering procedures, for example, reduced processing time from several days or weeks to as little as a few hours, according to Wiemels.

Now, a single customer representative handles the process from start to finish. Estimated annual savings: $3.2 million.

The company is also restructuring factory operations in hopes of trimming four or five levels of management between plant supervisors and workers. Workers carry more responsibility and handle tasks such as scheduling their own overtime.

They "feel like they are part of the process now," Wiemels says.

Still, Wiemels is the first to acknowledge that there's nothing easy about re-engineering. "You just have to bite the bullet," he says. "You have to determine it is the most important thing. It is tough, and we struggled."

Other examples of re-engineering projects in progress include the following:

Elf Atochem North America, Inc. is re-engineering to simplify operations, according to Robert Rubin, vice president of information services.

So far, the Philadelphia chemicals producer has redesigned an expense reimbursement program so that sales managers no longer have to sign off on every expense report. Accounting staff members take on more responsibility to manage expense accounts. Salesmen get paid more quickly. Total cost: less than $50,000.

Key Corp. is redesigning loan processing to achieve consistency across the Albany, N.Y., holding company's 10 banks and 847 branches.

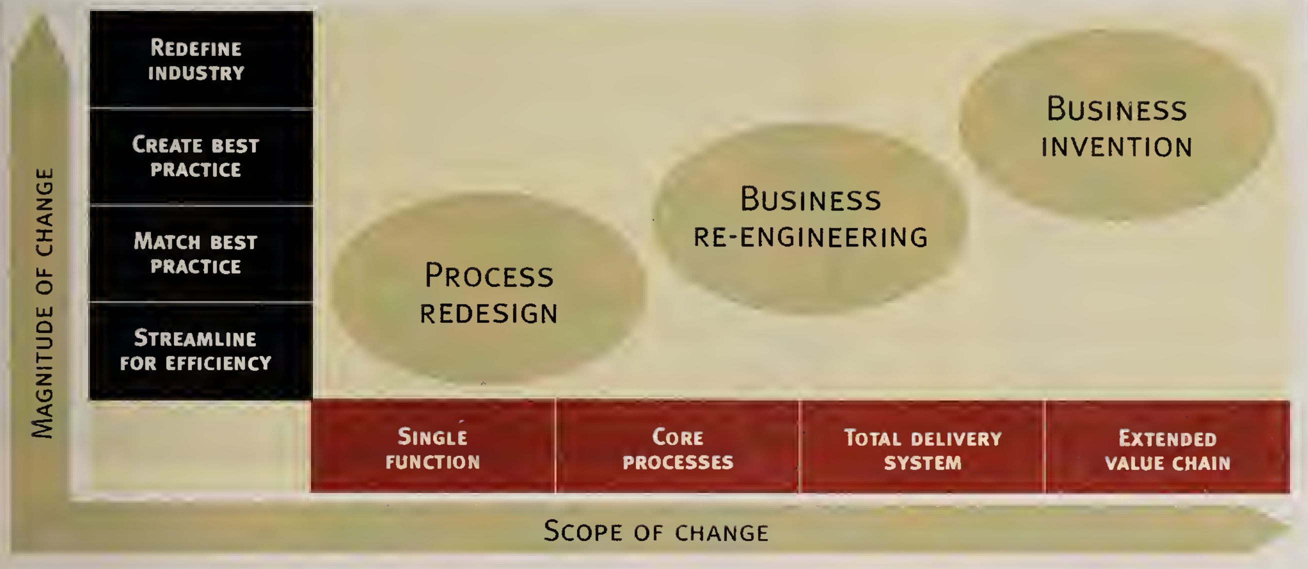
The goal, according to Jay Ward, executive vice president at Key, is to improve personal productivity by at least 20% and productivity with customers by 50%. Scheduled completion: mid-1994.

Borden, Inc. The $7 billion New York-based food products giant is restructuring so that several business units can "act as one company," says Demi Lappas, a vice president and chief information officer. Every process, from distribution to marketing, will be affected. Scheduled completion: three to five years, with preliminary results expected in 1993. Lappas would not disclose cost.

—*Rosemary Cafasso*

"But is it really re-engineering?"

Organizations often believe they are re-engineering. But many are actually only redesigning single processes, the least complex type of change. Re-engineering and invention involve much larger degrees of change.



Source: Andersen Consulting

"We are trying to transform what's been going on for the last 15 or 20 years, but we are going slowly," White explains. "We can't afford to just go in and upset the apple cart. We are doing it by major departments."

SRI's Burlton adds, "Users may get a 10% gain instead of a 50% gain. That's still good. It's not real re-engineering, but it's a step in the right direction."

Fad or fantastic?

Major changes in scope beg the question: Is re-engineering doomed to fizzle as fad of the year? Expert conclusions differ.

Some observers say the initial smoke is clearing, making way for more realistic change in many companies. Others warn that continued pressures will force companies to pursue a radical approach as their ultimate goal.

Though only one-fourth of companies trying re-engineering are doing total redesigns, Hammer says he's pleased. "It's . . . not discouraging. A couple of years ago, many wouldn't have known what re-engineering was." He notes that the approach may not be appropriate for every company. "I am not saying everyone should be doing it. I never said such a thing."

Hammer predicts that if another poll were taken next year, "40% would be doing it for real, 50% would still not be doing it but saying they are and 10% [would be] saying they are not."

COMPUTERWORLD SPECIAL REPORT

Not all industry observers are so bullish. Gateway's Klein says recent surveys suggest that "most companies who are likely to be involved are already involved." He says it's doubtful that a new wave of activity will follow.

Yet Erwin Martinez, a principal at CSC Partners, a CSC Index affiliate, argues that many organizations will be forced to expand the scope of re-engineering projects in the next few years.

"A lot of companies have worked themselves, through inaction, to a point . . . where now they have to do something radical," Martinez says. But he agrees not every company needs to reinvent itself. "I think there is a spectrum, from improving the work flow all the way to radical change," he says (see chart above).

For IS, the big challenge now is to distinguish between hype and help. "People tend to go and do things that a lot of other people are doing," notes Robert Hecht, a vice president of investment systems at Prudential Investment Corp. "What we have to do is figure out what's the best of these things that are going on." ■

Joseph Maglitta, senior editor, management, contributed to this report.

Fighting fear of change

Experts and veterans of re-engineering projects say the biggest problem you may face is not mastering the big management principals or implementing new technology; it's probably sitting in the next office.

The human factor — more specifically, near universal dislike of change — drags down most re-engineering projects.

And experts say people are very resourceful when it comes to acting on their fear of the unknown. Their behavior can take the form of passive aggression, such as not bothering to attend an important meeting, or surface as guerrilla warfare, such as publicly proclaiming that a proposed new process has all sorts of flaws and will bomb.

The key, experts add, is to expect these reactions and continually work to manage them.

"The really hard part [of re-engineering] is in making an organization change that doesn't want to change," says Steven Stanton, a vice president at CSC Index in Cambridge, Mass.

Here are ideas from veterans and consultants:

- **Communicate, communicate, communicate.** Try newsletters, videos, informal powwows, etc. The more management talks, the more quickly staff members grow comfortable with change. "If there's a chance people are going to lose their jobs, you can't keep them in the dark about it," says Mark Klein, a senior vice president and managing director at Gateway Management Consulting.
- **Staff re-engineering committees with the best and brightest.** It sends a message through the ranks that the company considers the project crucial.
- **Make sure senior management stays with the project.** "In large part, senior executives make pronouncements and then delegate," said Bradford Power, a principal at CSC Index and director of Index Quantum, a research and advisory service. "In re-engineering, they have to stay involved, and they aren't used to that."

—Rosemary Cafasso

STATE OF RE-ENGINEERING 1993

Most efforts are less than a year old

How long has the project been under way?

Number of respondents (Base: 72)

0-6 months	26
7 months to 1 year	18
More than 1 year to 2 years	16
More than 2 years	12

Justification is common

Was there a business case built for the project?

Number of respondents (Base: 72)

Yes	53
No	16
Other	3

IS gets involved early

At what point did IS become involved?

Percent of respondents (Base: 72)

Initiated the redesign effort	31
During the planning stages for the redesign	35
After the business process redesign was under way	3
Other	1
Don't know	2

Business heads most projects

Who is in charge of this project?

Number of respondents (Base: 72)
Multiple responses allowed

User department executive	26
IS executive	26
Corporate officer	17
Other	12
Don't know	1

Executives want approval authority

Who had to "sign off" on the project before it could proceed?

Number of respondents (Base: 72)
Multiple responses allowed

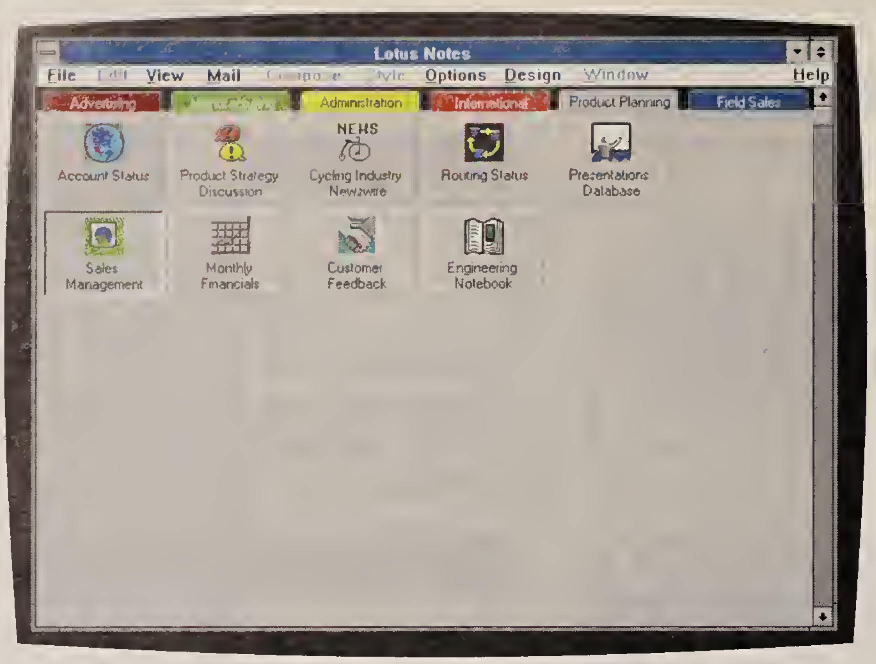
CEO	33
User department executive	18
Other	13
IS executive	16
CFO	9
COO	7
Don't know	1

Holdouts have mixed plans

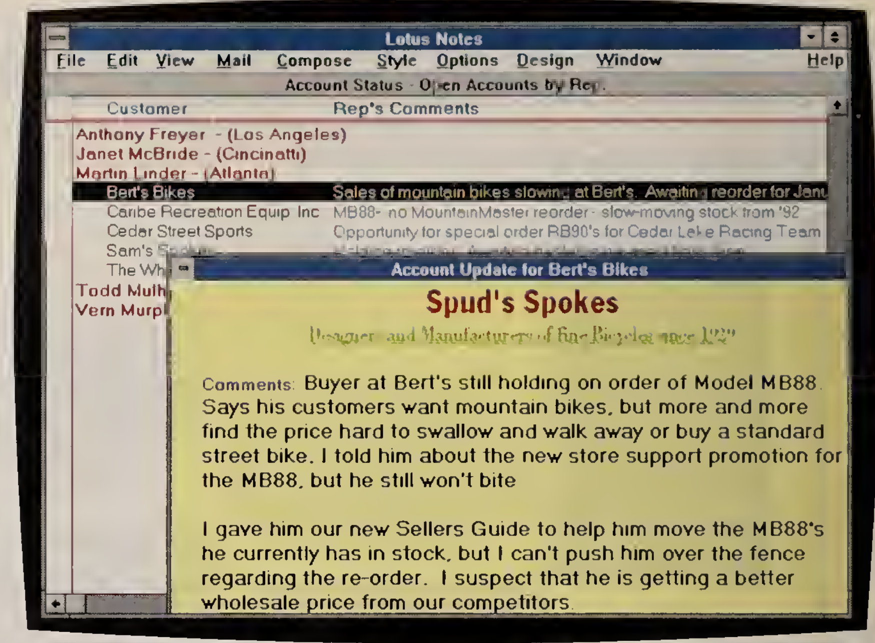
If you are not currently re-engineering, are you planning to do so?

Number of respondents (Base: 28)

Yes	7
No	17
Don't know	4


Lotus Notes
File Edit View Mail Compose Style Options Design Window Help
Advertising
Administration
International
Product Planning
Field Sales
Account Status
Product Strategy Discussion
NEWS
Cycling Industry Newswire
Routing Status
Presentations Database
Sales Management
Monthly Financials
Customer Feedback
Engineering Notebook

1. This is Michelle's Notes desktop. Each icon represents a different Notes application. She uses these to work with people all over the world including the field sales team, manufacturing, engineering, R&D, key customers and senior management. She regularly scans activities in the field by double clicking on ACCOUNT STATUS.


Lotus Notes
File Edit View Mail Compose Style Options Design Window Help

Account Status - Open Accounts by Rep

Customer | Rep's Comments

Anthony Freyer - (Los Angeles)
Janet McBride - (Cincinatti)
Martin Linder - (Atlanta)
Bert's Bikes — Sales of mountain bikes slowing at Bert's. Awaiting reorder for Janu
Caribe Recreation Equip Inc — MB88- no MountainMaster reorder - slow-moving stock from '92
Cedar Street Sports — Opportunity for special order RB90's for Cedar Lake Racing Team
Sam's S
The Wh
Todd Mulh
Vern Murp

Account Update for Bert's Bikes

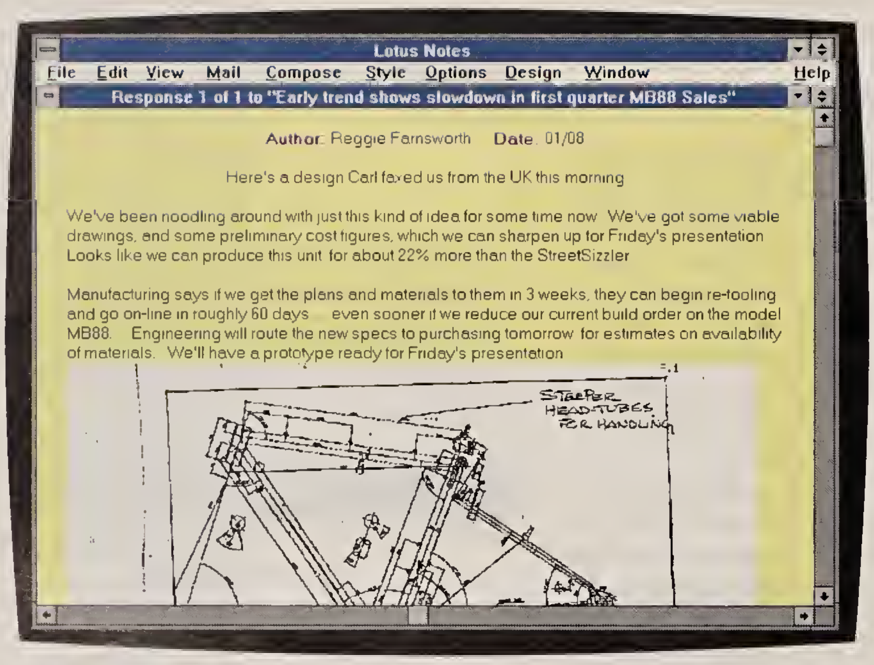
Spud's Spokes

Designers and Manufacturers of fine Bicycles since [illegible]

Comments: Buyer at Bert's still holding on order of Model MB88. Says his customers want mountain bikes, but more and more find the price hard to swallow and walk away or buy a standard street bike. I told him about the new store support promotion for the MB88, but he still won't bite

I gave him our new Sellers Guide to help him move the MB88's he currently has in stock, but I can't push him over the fence regarding the re-order. I suspect that he is getting a better wholesale price from our competitors.

2. Today, she notices a number of entries regarding a slow-down in closing first quarter reorders for their most popular model, the MountainMaster off-road bike. It seems the market for this high-priced bike is beginning to dry up. This could be a major problem.


Lotus Notes
File Edit View Mail Compose Style Options Design Window Help
STEEPER HEAD-TUBES FOR HANDLING

Response 1 of 1 to "Early trend shows slowdown in first quarter MB88 Sales"

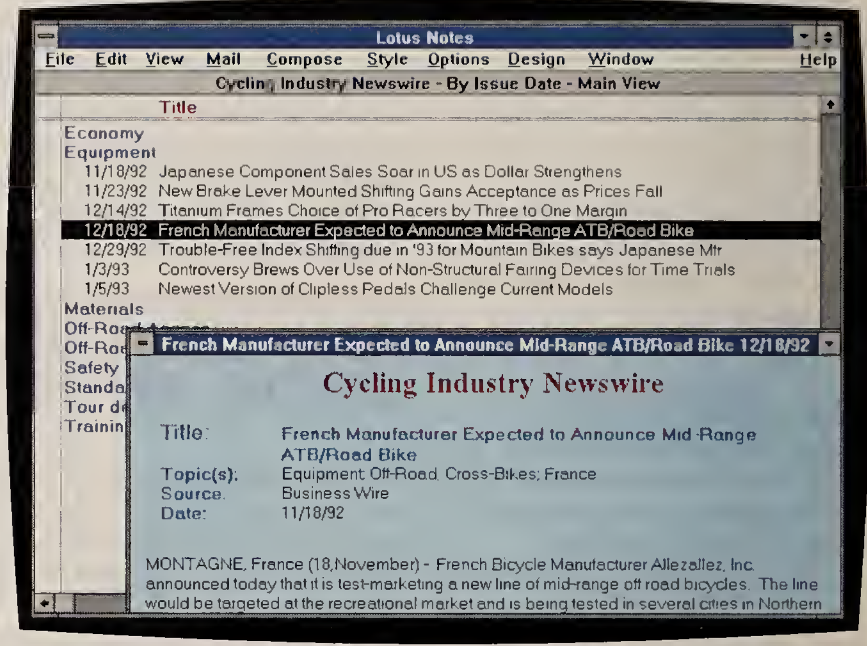
Author: Reggie Farnsworth Date: 01/08

Here's a design Carl faxed us from the UK this morning

We've been noodling around with just this kind of idea for some time now. We've got some viable drawings, and some preliminary cost figures, which we can sharpen up for Friday's presentation. Looks like we can produce this unit for about 22% more than the StreetSizzler

Manufacturing says if we get the plans and materials to them in 3 weeks, they can begin re-tooling and go on-line in roughly 60 days — even sooner if we reduce our current build order on the model MB88. Engineering will route the new specs to purchasing tomorrow for estimates on availability of materials. We'll have a prototype ready for Friday's presentation

5. The next morning she checks into the DISCUSSION database and this time finds an entry from Reggie in R&D. Reggie had also read Jim's message and is responding with a possible solution his people have been playing with. He pastes in an autocad illustration faxed to him from the U.K. using a Notes incoming fax gateway.


Lotus Notes
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Cycling Industry Newswire - By Issue Date - Main View

Title

Economy
Equipment
11/18/92 Japanese Component Sales Soar in US as Dollar Strengthens
11/23/92 New Brake Lever Mounted Shifting Gains Acceptance as Prices Fall
12/14/92 Titanium Frames Choice of Pro Racers by Three to One Margin
12/18/92 French Manufacturer Expected to Announce Mid-Range ATB/Road Bike
12/29/92 Trouble-Free Index Shifting due in '93 for Mountain Bikes says Japanese Mfr
1/3/93 Controversy Brews Over Use of Non-Structural Fairing Devices for Time Trials
1/5/93 Newest Version of Clipless Pedals Challenge Current Models
Materials
Off-Ro
Off-Ro
Safety
Standa
Tour d
Trainin

French Manufacturer Expected to Announce Mid-Range ATB/Road Bike 12/18/92

Cycling Industry Newswire

Title: French Manufacturer Expected to Announce Mid-Range ATB/Road Bike
Topic(s): Equipment; Off-Road; Cross-Bikes; France
Source: Business Wire
Date: 11/18/92

MONTAGNE, France (18,November) - French Bicycle Manufacturer Allezallez, Inc. announced today that it is test-marketing a new line of mid-range off road bicycles. The line would be targeted at the recreational market and is being tested in several cities in Northern

6. With a presentation on Friday, Michelle gets down to some quick market research by opening up the CYCLING INDUSTRY NEWS database. An organized source of live industry data, it provides a news report on a French company that has a couple months head start developing a hybrid bike.

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What would you do if you suddenly found out that your key product was in trouble? Could your organization react quickly and effectively?

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Michelle Cliffington is a product manager
for a bicycle manufacturer. She's responsible
for all product planning, market researc
and marketing activities for her produc
line. Notes helps her shift gears and
rush a new product to market.

See how she accesses, tracks,
shares and organizes information
in ways never before possible. How

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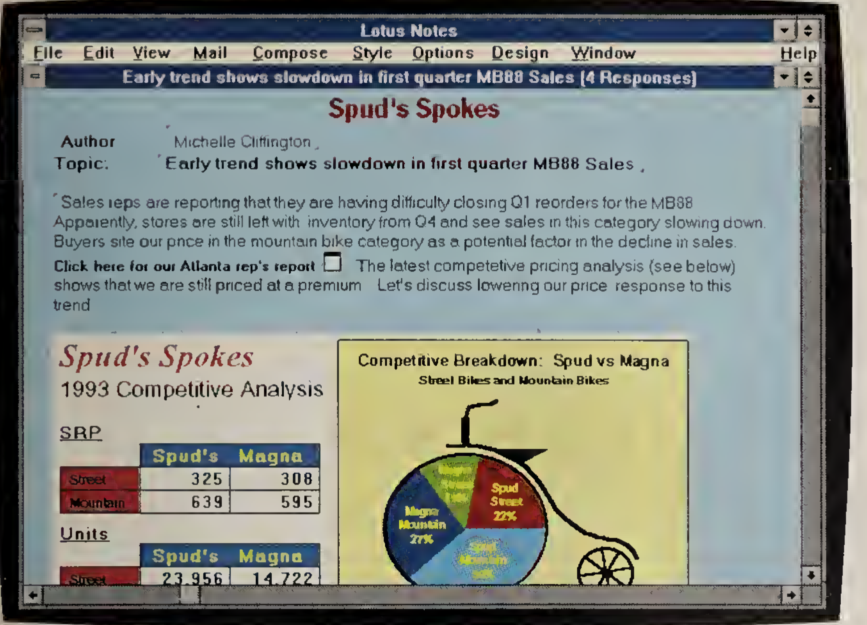

Lotus Notes
File Edit View Mail Compose Style Options Design Window Help
Early trend shows slowdown in first quarter MB88 Sales (4 Responses)

Spud's Spokes

Author Michelle Clifington

Topic: Early trend shows slowdown in first quarter MB88 Sales

Sales reps are reporting that they are having difficulty closing Q1 reorders for the MB88 Apparently, stores are still left with inventory from Q4 and see sales in this category slowing down. Buyers site our price in the mountain bike category as a potential factor in the decline in sales.

Click here for our Atlanta rep's report ☐ The latest competetive pricing analysis (see below) shows that we are still priced at a premium Let's discuss lowering our price response to this trend

Spud's Spokes

1993 Competitive Analysis

SRP

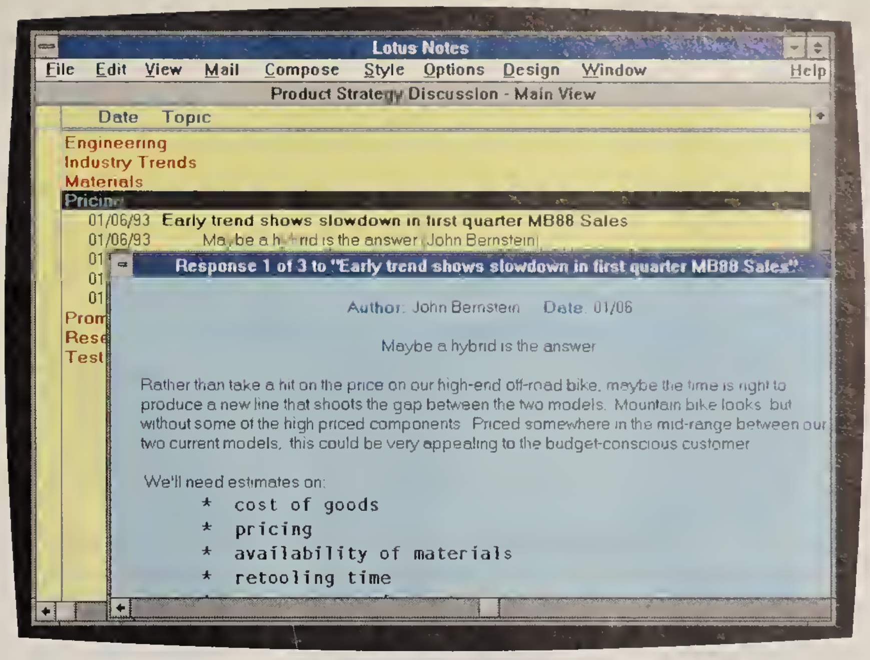
	Spud's	Magna
Street	325	308
Mountain	639	595

Units

	Spud's	Magna
Street	23,956	14,722

Competitive Breakdown: Spud vs Magna
Street Bikes and Mountain Bikes
Spud Street 22%
Magna Mountain 27%

3. She decides to recommend a price-reduction and double clicks into the STRATEGIC PRODUCT DISCUSSION database. This provides an organization-wide forum to discuss issues and brainstorm solutions. She links the report from the Atlanta rep directly into her Notes document. Then she uses DDE to embed some 1-2-3® charts into her document as well.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Product Strategy Discussion - Main View

Date Topic

Engineering
Industry Trends
Materials
Pricing
01/06/93 Early trend shows slowdown in first quarter MB88 Sales
01/06/93 Maybe a hybrid is the answer (John Bernstein)
Prom
Rese
Test

Response 1 of 3 to "Early trend shows slowdown in first quarter MB88 Sales"

Author: John Bernstein Date: 01/06

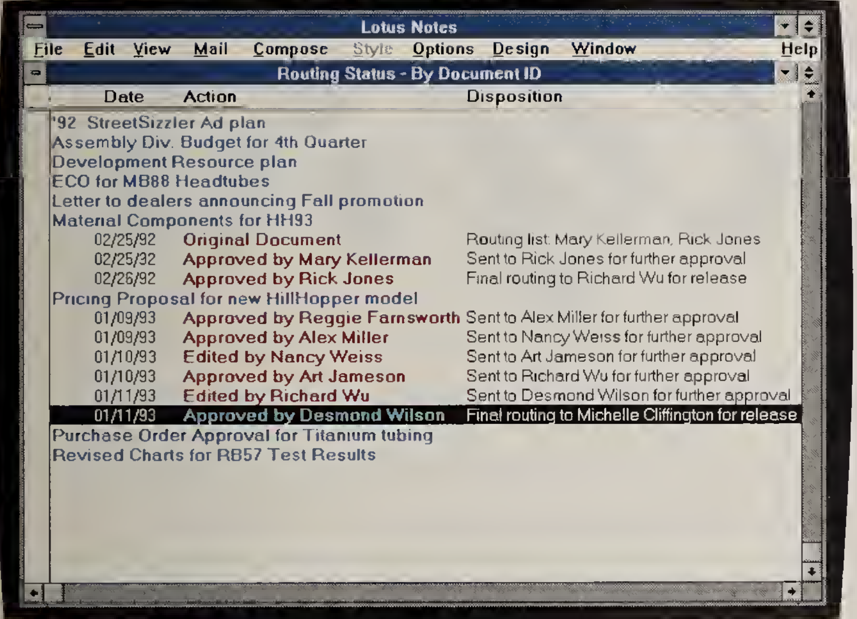
Maybe a hybrid is the answer

Rather than take a hit on the price on our high-end off-road bike, maybe the time is right to produce a new line that shoots the gap between the two models. Mountain bike looks but without some of the high priced components Priced somewhere in the mid-range between our two current models, this could be very appealing to the budget-conscious customer

We'll need estimates on:

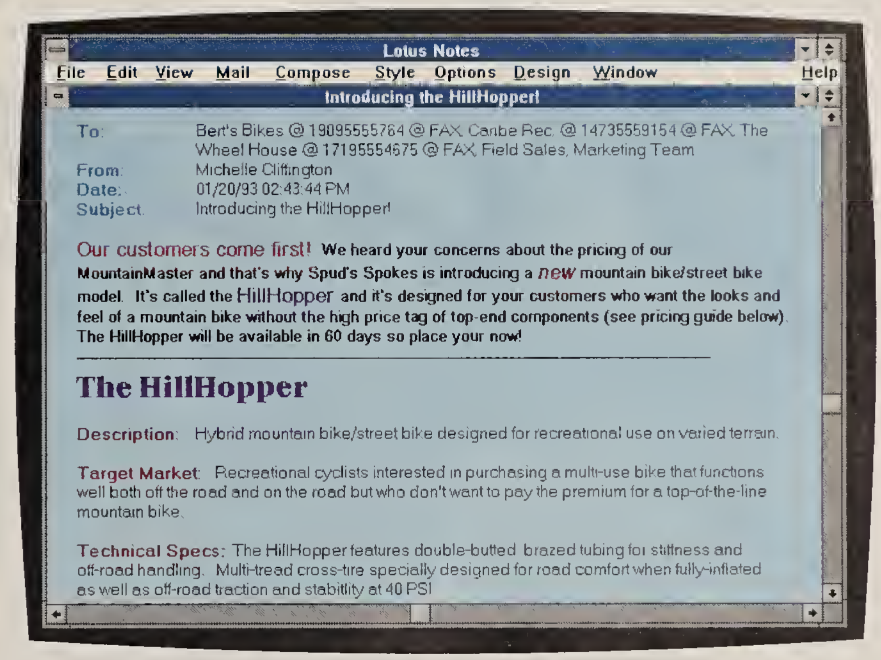
- cost of goods
- pricing
- availability of materials
- retooling time

4. Later in the day she re-enters the DISCUSSION database looking for responses. Her boss, John, has logged on from his hotel room in San Francisco. Rather than cut the margin, he suggests she explore the feasibility of adding a mid-priced bike to their line. He wants an initial presentation for Friday.


Lotus Notes
File Edit View Mail Compose Style Options Design Window Help
Routing Status - By Document ID

Date	Action	Disposition
'92 StreetSizzler Ad plan		
Assembly Div. Budget for 4th Quarter		
Development Resource plan		
ECO for MB88 Headtubes		
Letter to dealers announcing Fall promotion		
Material Components for HH93		
02/25/92	Original Document	Routing list: Mary Kellerman, Rick Jones
02/25/32	Approved by Mary Kellerman	Sent to Rick Jones for further approval
02/26/92	Approved by Rick Jones	Final routing to Richard Wu for release
Pricing Proposal for new HillHopper model		
01/09/93	Approved by Reggie Farnsworth	Sent to Alex Miller for further approval
01/09/93	Approved by Alex Miller	Sent to Nancy Weiss for further approval
01/10/93	Edited by Nancy Weiss	Sent to Art Jameson for further approval
01/10/93	Approved by Art Jameson	Sent to Richard Wu for further approval
01/11/93	Edited by Richard Wu	Sent to Desmond Wilson for further approval
01/11/93	Approved by Desmond Wilson	Final routing to Michelle Cliffington for release
Purchase Order Approval for Titanium tubing		
Revised Charts for RB57 Test Results		

7. A few days after routing her proposal to the product team, she wants to find out where it stands within the organization. She opens the ROUTING STATUS application to find that it has worked its way through the organization to Desmond, the senior decision-maker, and has been finally approved. So she's on her way.


Lotus Notes
File Edit View Mail Compose Style Options Design Window Help
Introducing the HillHopper!

To: Bert's Bikes @ 19095555764 @ FAX, Caribe Rec. @ 14735559154 @ FAX, The Wheel House @ 17195554675 @ FAX, Field Sales, Marketing Team
From: Michelle Cliffington
Date: 01/20/93 02:43:44 PM
Subject: Introducing the HillHopper!

Our customers come first! **We heard your concerns about the pricing of our MountainMaster and that's why Spud's Spokes is introducing a *new* mountain bike/street bike model. It's called the HillHopper and it's designed for your customers who want the looks and feel of a mountain bike without the high price tag of top-end components (see pricing guide below). The HillHopper will be available in 60 days so place your now!**

The HillHopper

Description: Hybrid mountain bike/street bike designed for recreational use on varied terrain.

Target Market: Recreational cyclists interested in purchasing a multi-use bike that functions well both off the road and on the road but who don't want to pay the premium for a top-of-the-line mountain bike.

Technical Specs: The HillHopper features double-butted brazed tubing for stiffness and off-road handling. Multi-tread cross-tire specially designed for road comfort when fully-inflated as well as off-road traction and stability at 40 PSI

8. Michelle closes the loop by communicating the news to their customers. Double clicking into the CUSTOMER FEEDBACK database, she faxes a memo directly from Notes to all retailers. In it she explains that the company has heard their problems and responded with the Hill Hopper. And with delivery in 60 days, they can order now.

can respond with
n Michelle shift gears.

ffortlessly people use Notes to respond and move the roject forward.

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inside JOB

RANDY LYHUS

Vendors try to sell you on their latest technology 'vision.' Ever wonder whether a vendor's internal IS staff practices what the company preaches?

By CW staff

You know the vendor pitch: "Downsize *(to our client/server tools, of course).*" "Use networks *(as long as they're ours).*" "Buy open software *(from us, if possible).*" After all, vendors have to make a buck. But what are they doing in their own information systems shops? Are their technology chiefs putting in place the very hardware, software and "solutions" their corporations hype?

IS departments in vendor companies are an interesting breed. While in many ways they are coping with the same issues your shop is — application backlogs, demanding users, doing more with less, rightsizing — they are also dealing with some unique situations.

Vendor IS staffs at companies such as Novell, Inc. and Microsoft Corp. often have the added pressure of acting as guinea pigs for their companies' products. Some, such as Microsoft, deal with users so technical that the users support IS, not the other way around.

We'd like to offer you a glimpse into the IS world at six vendor companies: IBM, Intel Corp., Sun Microsystems, Inc., Microsoft, Novell and Oracle Corp. We'll reveal whether these IS shops practice what their vendors preach and whether their IS chiefs' jobs are as trying — and rewarding — as your own. Read on. . . .

Certain IS shops in vendor companies act as **TEST BEDS** *for the vendor's products. This can be burdensome when trying to perform other IS duties. However, most IS chiefs say this testing has an important consequence: It spares customers from buggy products.*

Microsoft's IS group consists of a bunch of guinea pigs, and they're proud of it, according to David Tagliani, senior manager of information technology group operations. Staff members beta-test Microsoft offerings, as well as software or hardware from other firms.

"We would prefer to be surprised here in IS rather than have the customer be surprised," Tagliani says.

For instance, the IS staff was working with Microsoft's Windows NT several months ago and pinpointed a thorny situation that system professionals at large shops would balk at: NT could not process batch commands, nor did it have processes that could be programmed to run at a certain time without user intervention. Tagliani's group complained, and NT now contains batch functionality.

At **Novell**, acting as a front-line beta-test site is one of IS' most important jobs, says Gordon Jones, vice president of information services. The IS group supports varied networks, which, Jones acknowledges, adds to the work load. However, such a smorgasbord increases IS' value as an internal test bed for Novell products.

Novell's IS staff has been heavily involved in the upcoming NetWare 4.0 release, he says, giving constant feedback to engineering about any problems. His group is also testing NetWare Loadable Modules in its relational databases, NetWare global messaging and Novell multiprotocol router products.

"We *want* to be a showplace, and we want to

Vendor IS shops, *page 110*

IBM coverage by Johanna Ambrosio, senior editor; Intel coverage by Michael Fitzgerald, senior writer; Microsoft coverage by Christopher Lindquist, correspondent; Novell coverage by Michele Dostert, correspondent; Oracle coverage by Jean S. Bozman, senior West Coast editor; and Sun coverage by Maryfran Johnson, senior editor.

Vendor IS shops

CONTINUED FROM PAGE 109

flush out any problems before our customers see them. We're a good test bed precisely because our environment is so heterogeneous and our users are so knowledgeable," Jones says.

For **Oracle**'s IS group, "part of our whole mode of operation is to act as a test site to prove our software works," says Alan Tottle, vice president of the Network Products Division at the company.

Microsoft's David Tagliani *on beta tests: Keep the surprises in IS*

Tottle says only a small percentage of Oracle's data center floor is used for IS production. "About two-thirds of the floor is filled up with the platforms on which we validate our software," he says. "Each year, the mix of machines will change, depending on what computers are being sold in the marketplace."

The idea is that IS can put software through paces customers can't. For instance, Oracle was working with open systems for its internal setup a long time ago. "We've had OracleMail, a worldwide electronic-mail system, running for four years worldwide. And we put up the Oracle 7 database in full production when it was still in its alpha state. We would never ask a banking customer to put in an alpha version of the database."

But this test bed method is not always foolproof; Oracle has been known to ship buggy software. It has responded by instituting an internal quality assurance program that began in its applications division. Software passes through a number of testing phases before it is put into production.

CLIENT/SERVER *is on everyone's lips today, and the subject is no stranger to IS groups at vendor companies. But these groups are in the spotlight; because certain vendors have made it their business to push client/server, all eyes fall on IS to see if it is turning vendor hype into reality in-house.*

Sun, which preaches distributed open systems to the masses, is in the midst of a rightsizing operation of its own.

The company runs roughly 95% of its $4 billion business on its own workstation and servers and runs more than 300 Unix applications. Its hardware strategy is 100% based on the Scalable Processor Architecture microprocessor.

According to Thanos Triant, director of systems architecture at Sun, all the factory floors, computer-integrated manufacturing-type applications, warehouse distribution and factory test applications run on Unix and Sun workstations. Sun machines also handle sales quotation systems, distribution, cost analysis and decision support.

Today, a single Hitachi Data Systems Corp. mainframe is used for the master production schedule/manufacturing resource planning (MRP) application that supports three Sun factories in California, Massachusetts and Scotland. An Amdahl Corp. mainframe handles some limited development work for the MRP system. General ledger accounting resides on Hewlett-Packard Co. minicomputers running software from The ASK Group, Inc.

Sun says it plans to migrate from both the mainframe and the minicomputer systems in the next two years to a distributed system based on Oracle manufacturing and financial applications.

William Raduchel, chief information officer, counts the transition to the Oracle applications as the toughest challenge facing his IS operation this year. "It will take 15% to 20% of the IS budget this year for the transition," he says. "More than half our budget is spent running the platforms in the current desktop environment, so a lot of short-term projects are going to suffer."

The move to client/server computing has provided Sun with several benefits (see details page 113). It has cut 100 days from the time a customer places an order until the vendor collects payment.

"That's $750 million in cash, which we gained by changing all our business practices," Raduchel notes.

The greatest benefit of Sun's approach is cost-effectiveness, he says. While most firms spend $10,000 to $15,000 per employee per year to put PCs on their desktops, Sun puts a Unix workstation there for $5,000 per employee per year.

"One thing about our operation that surprises people is our willingness to duplicate data and run our desktops like a data center, not a PC network," Raduchel adds. That means individual desktops are dataless, with all application software and user data securely stored on centralized servers.

As recently as five years ago, interest in client/server computing at **Intel** was almost nonexistent, says Neal Franking, the company's director of corporate information services. That's because the strategy didn't jibe with Intel's image of its business; Franking says Intel saw itself as simply a chip manufacturer.

Today, however, things have changed. The corporate vision is much closer to business use of technology. Thinking has shifted from "What are chips used for?" to "How do PCs affect the metamorphosis of the business process?"

"To do things like just-in-time business requires you to be really streamlined and responsive, which aligns very much with" client/server, Franking says.

Intel has roughly 25,000 PCs based on its own processors, reduced instruction set computing (RISC) workstations, Digital Equipment Corp. VAXs and IBM mainframes in its IS hopper.

Franking estimates that Intel is less than halfway to unplugging its mainframes. Its most significant foray into downsizing comes from a $1.7 million effort in its OEM hardware division in Portland, Ore. Intel's OEM hardware business generates more than $1 billion in annual sales and employs 3,500 people. It has moved off mainframes since a downsizing effort in December 1991.

"For the first six months I was here, I said anybody downsizing was nuts," says Colin Evans, director of IS at the division. "To take out a big mainframe system is a complicated undertaking because it's typically been built up and had a lot bolted onto it over the years."

But Evans was won over by promises of savings and improved customer service. By taking its MRP system off a mainframe and placing it onto networked PCs, Evans says, mainframe chargebacks to corporate may drop from $4 million in 1991 to $1.5 million this year.

On the business side, Intel's new PC MRP system enabled its customers to order directly from the factory, which has reduced Intel's overhead.

But in a shift to move E-mail off a mainframe, Intel's efforts have gone less smoothly. The company has made strides in consolidating some 12 different E-mail systems but still has a ways to go. It has moved 14,000 of its 18,000 knowledge workers onto PC-based E-mail, though much of the messages get routed through mainframe-based E-mail.

"This really tests your infrastructure; you have to be accountable for the entire path, from the local PC to the local hub to the transoceanic link to the switching center," Franking says.

Vendor IS shops, *page 112*

IBM

Message to its customers:
Buy. Through its own products or third-party goods, IBM says it can fit any customer need.

Does IBM practice what it preaches?
IBM's internal systems tend toward big (it says mainframe MIPS are still "growing in the double digits") and primarily Blue.

Business units have mainframes in data centers worldwide, as well as specific equipment, depending on need. The product design laboratories, for example, have RISC System/6000s with simulation software. The manufacturing units have minicomputers and workstations, with linked distributed databases for parts numbers and other information. Marketing and sales are moving into LANs.

IS organizational structure:
IS people who support business units report into the management of the business unit.

Business unit IS has dotted-line reporting responsibility to Gerald Prothro, IBM's vice president of information and telecommunications systems. This group deals with the big picture. It inspects all facilities yearly to check for functional excellence and financial astuteness.

IBM IS has 20,000 worldwide employees and a $4.5 billion annual budget.

Downsizing do's

Here's how to avoid the pitfalls

Downsizing from mainframes to LANs comes with its own risks. Gordon Jones, Novell's vice president of information services, offers this advice:

With the proliferation of LANs at Novell, the IS department says centralized management, control and responsibility for departmental LANs seems to make the most sense for two reasons: Departments want to get back to business, and management is enforcing controls to protect precious data stored on LANs.

To ease backup and security procedures, Jones says, he has consolidated the company's servers. "Though they take up less real estate than a mainframe, our servers contain Novell's real assets: our data. So these servers have to be subject to the same rigorous security, backup and data integrity rules as mainframes."

But Jones stresses that mainframe-level security does *not* mean organizing your LAN IS staff on a mainframe-based model. Instead of separate departments for communications, systems and applications, Jones recommends organizing LAN-based IS staff members into interdisciplinary teams. Problem resolution requires communication.

"We do more work on team building than we do on technical training," Jones says. "Human collaboration is still the key to productivity — in networks, just like anything else."

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Vendor IS shops

CONTINUED FROM PAGE 110

As the transition from mainframes picks up speed, networked PCs as a **DOWNSIZING** *approach are in vogue at vendor IS shops.*

At **Microsoft**, the message for customers is to downsize from mainframe applications and move to Windows and networks. The company's IS operations follow that mold but not strictly; Microsoft has certain core business processes on large systems. Specifically, it uses DEC VAXs for accounting and manufacturing, IBM Application System/400s for sales analysis and an IBM Enterprise System/9000 for product testing.

"Nobody is advocating that we simply chuck all that stuff. However, those systems will start to go into a maintenance mode in the next 12 to 18 months," Tagliani says.

Microsoft is in the process of purchasing RISC-based systems from Mips Technologies, Inc. and is looking at DEC's Alpha. "Once Alpha comes out, we'd like to start upgrading the VAX/VMS systems to Open VMS on Alpha, then move to Alpha 'mainframes' running Windows NT," Tagliani notes.

He says that via Alpha, DEC is providing Microsoft with a transition platform to NT. Tagliani says it's important for Microsoft's 350 worldwide IS employees to know what it's like to downsize and say to users, "The water's OK; come on in."

When **Novell** executives tell corporate IS buyers they can run their business on local-area networks, they know what they're talking about. Novell's IS department supports 3,600 employees, who generate almost $1 billion in sales. The company does all its development, marketing and support efforts on Novell NetWare LANs. According to Jones, Novell realizes the same cost savings it pitches to its customers: In 1992, IS costs, including telephone, were only 1.3% of sales.

Microsoft

Message to its customers:
Downsize mainframe applications and move to a Windows-based infrastructure of networks and Windows NT servers.

Does Microsoft practice what it preaches?
Microsoft's infrastructure consists of about 1,000 file servers worldwide, with 150 to 200 running OS/2 1.3, 280 running Xenix and 25 to 30 running NT. The rest run a variety of other operating systems.

All Microsoft systems are connected via a 30,000-node worldwide network. The company runs its core business processes on large systems — DEC VAXs, IBM AS/400s and an ES/9000 mainframe.

IS organizational structure:
IS is structured to correspond to business units. The company has 350 IS people worldwide.

Intel

Message to its customers:
Improve business performance by linking workers on networks of microprocessor-based computers. This strategy goes hand in hand with client/server.

Does Intel practice what it preaches?
Intel estimates it is less than halfway to unplugging its mainframes and moving into a client/server environment. Intel has some 25,000 PCs based on its own processors but also has RISC workstations, DEC VAXs and IBM mainframes.

IS organizational structure:
IS is structured geographically, with each region having its own site manager. Individual site managers sit in on an IS council, an umbrella organization that decides overall system direction for the company. The IS division reports directly to corporate.

The IS community has been energized by the drive to **OPEN SYSTEMS** *and interoperability in the hopes that it can choose systems based on need and price rather than worrying about equipment working together.*

Oracle promotes interoperable, open systems on heterogeneous corporate networks; the company supports more hardware/software combinations than any other relational database management system vendor. For instance, Oracle 7 can run on more than 80 platforms.

Oracle itself has most of its internal applications, including E-mail and accounting packages, running on Unix, according to Ronald Wohl, senior vice president of applications development. But some internal applications for the company's $1.18 billion business run on a 55-node DEC VAXcluster. Oracle used VAXs as its primary development platform from 1977 to 1992, when it shifted to Sun's Unix platform. Wohl says the move from VAXs to open systems has been easy. "The database and applications are written in a portable fashion, so they run essentially unchanged across environments."

But Tottle has one Unix caveat: The systems Oracle is adopting "don't have the tool sets more mature products have," such as performance monitors, that enable mainframe data centers to fine-tune their operations.

IS chiefs in vendor companies say they are under the same kinds of pressures as their colleagues in user companies — they want to cut costs but not affect the quality of processing or service. **CONSOLIDATION** *and* **OUTSOURCING** *are integral to their plans.*

Like many of its customers, **IBM** is discovering the efficiencies of megacenters populated by the largest and most powerful mainframes available, says Gerald Prothro, vice president of information and telecommunications systems.

Executives everywhere will recognize his mantra: "We want to save money, be more efficient and handle more volume."

Prothro's group has established a consolidation mandate. "So, if we find a region with 15 separate glass-house environments, that is clearly deleterious," he says.

Beginning in 1988, IBM began consolidating its data centers worldwide and, within the past year, began moving data center operations under the purview of IBM's outsourcing company, Integrated Systems Solutions Corp. (ISSC).

Here in the U.S., IBM has moved all the marketing and sales data centers to ISSC and is working to do the same for the manufacturing and distribution units. So far, Prothro says, the program is working just fine. "We have been able to keep costs flat, with the total MIPS delivered up between 15% and 22%."

IBM will also export this consolidation and outsourcing plan overseas. IBM Europe is now consolidating more than 30 data centers down to eight or nine; IBM Japan had nine such sites and will cut those to four by the end of 1993.

Oracle's idea of consolidation is cramming more millions of instructions per second into the same 13,000-sq-ft computer room space without expanding the computer room itself. Even now, the data center (a total of 22,000 sq ft in size) is small in comparison with other Fortune 500 companies' facilities, in which 50,000 sq ft or more is the norm.

"We have lots of small machines now, and we're evolving into having fewer, larger machines. Sooner or later, we'd like to start on the path of having dark data centers," automating data center functions and reducing staff, Tottle says.

Novell

Message to its customers:
You can run your business on LANs.

Does Novell practice what it preaches?
Novell's IS department supports 3,600 employees, who generate almost $1 billion dollars in sales. The company does all its development, marketing and support efforts on NetWare LANs.

With seven mergers and acquisitions in 10 years, the company inherited myriad PCs running DOS, Windows and OS/2, Apple Computer, Inc. Macintoshes, Unix boxes and Next, Inc. workstations. It has three DEC VAXs. The IS group supports all applications on NetWare.

IS organizational structure:
The organization is basically a hierarchical, centralized structure headed up by a vice president of IS. The group has 113 people. IS costs were nearly $1 billion in 1992.

Oracle

Message to its customers:
Portable, open systems, most notably Unix-based ones.

Does Oracle practice what it preaches?
Oracle claims it runs its $1.18 billion global business on its own software on a variety of hardware. Its internal applications, including E-mail and accounting, run on Unix.

But a tour of the data center showed that some internal applications run on the DEC VAXcluster.

The data center contains Sun servers, HP 9000s, Tandem Computers, Inc. processors, an Amdahl mainframe, an IBM AS/400, some Unisys Corp. Unix machines, an IBM 4381, older Wang Laboratories, Inc. VS minicomputers and two new NCube 2 supercomputers.

IS organizational structure:
The vice presidents of its two primary IS groups report directly to Oracle CEO Lawrence J. Ellison.

To that end, Oracle is planning to install automated tape libraries and optical disc drives to reduce the need for human operators to place IBM 3480-type tape cartridges in tape drives for backups and off-site archiving.

What would an IS manager's life be without **USERS**? *For vendor IS chiefs, the problem isn't that users know too little but that they know too much — a bummer as well as a boon.*

Microsoft's users play an important, albeit unusual, role in its systems department's life: They provide IS with technical support. While IS concentrates on keeping the systems environment running, technical details are often left to users, who are experts on the Microsoft software on which the systems run.

"We use our own Microsoft [non-IS] people to get assistance. If we have a LAN Manager problem, we go to LAN Manager people," Tagliani says.

The user/IS information flow doesn't stop at support. "It's common for the young, excited group of [non-IS] developers to come up with their own solutions" to systems problems, Tagliani says. And IS wants to make the most of this knowledge. "What we ask is that if they have a way of doing things that's better than the way we have provided, by all means let us know," he says.

For some shops, however, savvy users are to be avoided. Though all of **Novell**'s 1,000 production servers are connected, Jones maintains a "firewall" between production servers and the engineering networks that Novell programmers are busily crashing, fixing and rebuilding.

"I mostly turn a blind eye to engineering; I don't want to know what crazy things they're doing over there," he says. "All businesses isolate their development environment from their production environment; when your business is networking, you have to be doubly careful."

With all the cutting-edge technologies and advanced research, it's hard to believe that **APPLICATION DEVELOPMENT** *gives vendor IS staff members fits.*

Yes, **IBM** — even with its virtually unlimited access to the best techno-goodies the computer industry has to offer — has an applications backlog. Although Prothro declines to specify what that is, he says IBM is addressing it in several ways.

Intel's Neal Franking: *Firm is less than halfway to unplugging its mainframes*

On the drawing board is a plan to distribute the power of the workstation so individuals are at the center of the compute environment and have access to all its pieces.

Among the applications available to the user would be what Prothro calls "enablement software," which would turn end users into programmers who save IS time by building their own applications.

IBM has also changed its applications design methodology. Instead of the old way of sequentially developing code and testing it, IBM is using multidisciplinary teams made up of IS and users. "We structure them around the user problem being solved, and we interactively test and simulate," Prothro says. "That way, a user doesn't sit there with nothing, and satisfaction goes up."

The IS staff at **Novell** is trying to cut back on applications development primarily by using off-the-shelf packages and farming out development work.

If it can't find a commercial product, Novell IS staff members will do small, front-end programming tasks, but they usually contract out major projects. "It helps us handle the peaks and valleys of application demand," Jones says, "and gets us expertise in new technologies such as object-oriented programming."

Jones says he wants to keep Novell engineers busy adding value to NetWare, not sitting in IS reinventing the wheel.

Sun, for its part, has some internal development rules so IS doesn't get stuck with runaway development projects.

One credo is to recover the cost of a software project within months. IS also insists that the same version of Solaris development tools is used companywide to ensure high code reusability.

"One of my rules is that no project is allowed to take more than one year, 10 people and $1 million to complete," Raduchel says.

One example of an application developed this way is Sun's internal SO Tool. It took one year, six staff members and $750,000 to build. •

Sun

Message to its customers:
Distributed, Unix-based client/server systems that adhere to open, standard technologies.

Does Sun practice what it preaches?
Sun has a 22,000-node TCP/IP network controlled by the company's own distributed network management environment. Sun servers in local offices handle all database queries. New systems are built around distributed copies of the main database. Sun does have mainframes but says they are just another resource on the network.

IS organizational structure:
Sun has a 1,000-member centralized IS organization. Its IS budget is roughly $200 million.

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The escape from outsourcing

Last week, Dana Crenshaw, a programmer/analyst at an organization in Georgia, described the initial shock of learning that his organization was contemplating outsourcing and the experience of undergoing an efficiency audit. In the second part of his tale, Crenshaw and his colleagues await the recommendations of the outside consultants who conducted the audit.

Tuesday, Sept. 29, 1992
We received word today that the results of the department audit conducted by the consultants will not be discussed at the executive meeting until November because the project leader is behind schedule. In the meantime, why live in uncertainty? Some of us are updating our resumes, just to be safe.

On the other hand, by jumping ship prematurely, we risk missing out on an opportunity that could possibly accelerate our careers. I think the problem lies in unfamiliarity with outsourcing companies.

Thursday, Oct. 22, 1992
We found out today that we may not know until January. The lateness of the project can be attributed to many factors. For instance, about halfway through the interviews, the project manager decided to talk to everyone on staff instead of just a sampling of people. These additional interviews slowed the process.

By now, though, we have resolved not to worry about what will happen and concentrate on our work. Our boss commended us for our patience and continued level of production. This was very much appreciated.

Monday, Dec. 14, 1992
Today we were all given a briefing on what to expect as a result of the audit. Recommendations will be presented for action at February's meeting. Recommendations to be made include filling vacant positions such as an executive director of IS and quality assurance professional (a new position). The future of IS hinges on these positions being approved.

Monday, Dec. 14
Even though we have a lot of changes to make, one of the changes will not be outsourcing. The audit report said that with outsourcing, we would lose both money and control of the IS department.

The audit report was not short on problem areas. In addition to filling the executive director post, the following problem areas were brought up:

- Technology decisions are not organized or controlled.
- There is no formal systems development methodology for developing applications.
- End-user requirements change during development and are not always included.
- Financial, personnel and payroll systems are outdated.
- There are no set standards for screening and hiring personnel.
- Personnel skills, career paths and performance expectations are not defined clearly.
- Investment in training is not adequate to support future requirements.
- Quality control is inadequate.
- We lack disaster recovery plans.

Monday, Dec. 14
Are we excited to finally have something done? Not really! The top-level positions may not be filled until July. This means we will have to maintain our current course for six months or so.

Even though we have a lot of changes to make, one of the changes will *not* be outsourcing. The audit report said that with outsourcing, we would lose both money and control of the IS department.

So for now we are "safe."

Are we excited to finally have something done? Not really! The top-level positions may not be filled until July. This means we will have to maintain our current course for six months or so.

Friday, Feb. 12, 1993
Here ends this chapter in "The Life and Times of IS."

Today, the following recommendations (as a result of the problems outlined in the audit report) were approved:

- Hire a full-time executive director of IS.
- Define a quality assurance function within IS.
- Develop an IS strategy and technology plan.
- Select and implement an application development methodology.
- Upgrade the payroll system.
- Develop an IS skills matrix.
- Conduct an internal audit of IS.
- Adopt an IS security policy.

The most significant of the approvals is the hiring of an executive director. We don't know when they plan to fill the position, but the fact that they will indeed fill it is enough for us to believe that brighter days are ahead. Needless to say, we are glad this issue has finally been brought to a close.

Once the director is hired, I expect the pace to pick up tremendously. But for now we all are grateful that we still have a place to call home.

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The Experts

Production control: Racing the clock for project delivery

career CLOSE UP

By Alice Bredin

Ten people in New Jersey make sure local residents and businesses can get 411 directory assistance and 611 emergency phone service whenever they need it. Every month these same 10 people process all the monthly financial information for one of the largest companies in the state and ensure its accuracy under deadline.

These linchpins are members of the production control department at Bell Atlantic Information Systems in Madison, N.J. The 24-hour operation at New Jersey Bell schedules and maintains jobs and runs real-time systems such as 411.

Production control departments are in charge of planning, scheduling, running and distributing computer jobs within a company. In this department, professionals work primarily on mainframes.

By all counts, this is a career that involves pressure because the nature of running jobs is deadlines. However, most people also say that the hours, barring problems, are reasonable, and the variety of work makes it interesting.

"There is pressure involved because we're doing important projects that people inside and outside Bell really depend on," says Eric Muse, manager of applications maintenance control at Bell Atlantic.

Step by step

Joe Gerardo, production manager of operations at Thompson Financial Services, Inc., a financial publishing firm in New York, says he's enjoyed production control at all levels; he has worked his way up the career ladder from operator to production manager.

Like Gerardo, most production managers have worked their way up the ladder. Operators' jobs are most often obtained right out of college, and promotions to analyst or technician usually precede a manager's job.

Production control operators enter data, ensure that systems are functioning properly and run jobs. At the next level, analysts or senior production control employees determine when projects will run, implement new applications and schedule jobs.

Production control managers are the liaisons between workers in production control and entities that need to run jobs. They also purchase equipment, choose new applications and resolve deadline and technical problems.

Shelly Satterfield is production control manager at Dittler Advanced Data Systems, the Oakwood, Ga., data division of Dittler Brothers, Inc., an Atlanta printing house. She started as a book binder with some computer knowledge. She then worked in data entry and, over a six-year period, was promoted to manager without having a college education.

After manager, the next step is director of operations. In this job, responsibility is usually divided between production control and other departments, including security and disaster recovery.

During the last few years, production control management has been moved out of computer rooms and into the corporate environment. Managers are now able to work with the corporate entities that need production control services.

Uncertain future

One potential downside of production control is that the IS industry is moving away from mainframes. Therefore, a department running production jobs may no longer be necessary.

"If you have departments that are getting a turnaround in information because they can run something from their desk, there may not be a need for us," Muse says.

Walt Thyer, vice president of the Association for Computer Operations Management, Inc., an Orange, Calif.-based association of computer operations managers, says this is because computing power is moving to the desktop, as well as downsizing and consolidation. But, Thyer does not see this trend as ending production control jobs.

Thyer says production control employees possess valuable technical skills that they can parlay into a new position, helping users with backup and disaster recovery.

Bredin is a free-lance writer based in New York.

Production control career ladder

PRODUCTION CONTROL OPERATOR

Enters data, ensures that systems are functioning properly, schedules and runs jobs.

SALARY RANGE
$15K TO $20K

SENIOR PRODUCTION CONTROL SPECIALIST/ ANALYST

Schedules and mechanizes the processing of programs.

SALARY RANGE
$25K TO $35K

TECHNICAL SUPPORT

Provides internal or external repair and assistance with hardware and software.

SALARY RANGE
$25K TO $35K

PRODUCTION CONTROL MANAGER

Liaison between workers in production control and entities that need jobs run. Purchases equipment, chooses new applications and resolves technical problems.

SALARY RANGE
$35K TO $40K

MANAGER OF SYSTEMS DEVELOPMENT/MIS DIRECTOR

Oversees production control department along with other technical departments.

SALARY RANGE
$50K TO $120K

FOCUS Production control coordinator

As production control coordinator at Dittler Advanced Data Systems, Shelly Satterfield talks to just about everyone in the company. Her job is to make sure Dittler's print jobs are running smoothly.

Every day at 8:30 a.m. and 4:30 p.m., she meets with data personnel and sales representatives to discuss job progress and get updates on new business.

In between, Satterfield walks to the proof room or data center to answer technical questions and to check on the status of various projects.

"It's a great job for me because I like organizing things my way, talking to people and helping people," Satterfield explains. "But I also have to be patient and explain to reps why they cannot always get jobs completed by the deadline they want." —*Alice Bredin*

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Philadelphia: City of stability and contentment

By Jill Vitiello

PHILADELPHIA INFORMATION SYSTEMS professionals are pretty content in the City of Brotherly Love. Job turnover is low, and the economy is stabilizing.

Hiring managers and recruiters complain that it's tough to steal good people away from their jobs. In addition, they aren't seeing the flurry of resumes from displaced IS people that they had seen as recently as two years ago, nor are they seeing swarms of unemployed ISers at industry meetings like they once did.

During the past two years, Philadelphia was gripped by the recession that impacted most Northeastern cities. Now, however, it seems that companies are emerging leaner and more agile. In order to stay that way, they are hiring contract workers to help meet IS demands.

Others have found ways to reassign current staff to fill the voids. For instance, Russell Strover, vice president of IS at Keystone Insurance Co., trained some of his programmers as analysts when he couldn't find qualified candidates for the openings. From his team of 55 IS professionals, Strover selected internal candidates who exhibited strong analytical skills as well as solid technical expertise for career development. It's an approach he continues to use when warranted.

Some companies are cautiously waiting to see what parts of President Clinton's economic proposal are passed, and others are sanguine about the future. The 40-member IS organization at the U.S. Department of the Treasury in Philadelphia probably won't be downsized as a result of Clinton's proposals because it provides an essential service: producing Social Security and tax refund checks. But according to Robert Ciullo, deputy manager of the electronic operations branch, Financial Management Services, it may see a salary freeze.

And then there were few

The bulk of IS opportunities in Philadelphia arise through attrition. Robert Puphal, director of IS at the Institute for Scientific Information, a secondary database publisher, has two midlevel analyst openings that became available this way.

Even those companies that are cutting back are focusing on the customer in an attempt to distinguish themselves from their competition. At Packard Press, the team of three IS professionals is providing a whole new range of IS services to its customers in order to attract and retain business. They're visiting customer sites, writing programs and macros and providing desktop publishing training.

While not in a position to hire right now, Michael Kuehl, director of information services, says if he were going to hire more people, he would look for a "multifunctional team player" with programming and desktop publishing skills in addition to problem-solving abilities.

Philadelphia's IS managers all have their own personal wish lists of industry professionals they would hire. Patricia O'Hara, manager of IS at law firm Harvey, Pennington, says she would love to find someone with connectivity and gateway experience.

Suzanne Fairlie, president of Pro-Search, Inc. in nearby Conshohocken, Pa., confirms that hiring managers want people who can hit the ground running in the PC, local-area network, client/server environment and who have mastery of graphical user interface design and programming.

Philadelphians agree that the city itself is one of the reasons for IS professionals' overall contentment. It is large enough to provide a diversity of interesting IS jobs and to attract vendors' demos and trade shows featuring new technology. Yet, it is also small enough to establish a reputation in the IS community and make networking with IS peers easy and enjoyable.

Vitiello is a free-lance writer based in East Brunswick, N.J.

REGIONAL SCOPE Philadelphia

Coming and going

Moves into Philadelphia	1992	8,561
	1991	8,136
Moves out of Philadelphia	1992	11,068
	1991	11,402

Source: Quarterly marketing study with 10 member carriers of the American Mover's Conference/ Household Goods Carrier's Bureau in Arlington, Va.

Unemployment rates

November 1992	7.7%
1991	8.0%

Source: Bureau of Labor Statistics

Median housing costs

1992	$117,600
1991	$118,400

Source: National Association of Realtors

Interesting facts:

- Founded in 1862 by William Penn, an English Quaker
- Was the nation's capital until 1800
- The Declaration of Independence was adopted in Philadelphia's Independence Hall, and the Constitution was written there
- Home of the Liberty Bell
- Ben Franklin is buried in Philadelphia's Christ Church burial ground
- Home of five pro sports teams: the Eagles (football), the 76ers (basketball), the Flyers (hockey), the Wings (lacrosse) and the Phillies (baseball)
- Host to the Dad Vail Regatta, the largest college crew regatta in the U.S.
- Second largest city on the East Coast, fifth largest in the country
- City population 1.68 million; metro population 5.78 million

Source: Philadelphia Convention and Visitors Bureau

Largest employers
(By number of employees)

① University of Pennsylvania
② Thomas Jefferson University
③ Corestates Financial Corp.
④ Strawbridge and Clothier
⑤ Bell of Pennsylvania
⑥ Cigna Corp.
⑦ Albert Einstein Healthcare Foundation
⑧ Hahnemann University Hospital
⑨ Philadelphia Electric Co.
⑩ Consolidated Rail Corp.

Source: Philadelphia Chamber of Commerce

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Philadelphia Regional Scope

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(Administrative Faculty Status)

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- Manages a staff of technical and support personnel by hiring, training, setting work priorities for, supervising, and evaluating personnel. Monitors activities in all areas to ensure that all activities are conducted in a professional manner
- Performs project management by providing needs analysis and systems development planning services to faculty and administrators interested in procurement or construction of computer software systems.

Qualified Candidate:

- Should possess a Masters degree in appropriate discipline and have extensive experience in supervision of technically oriented personnel, in planning and management of information processing services and in the development of subordinate managers

Please send a letter of application with a resume and the names, addresses, and telephone numbers of three references to Ms Carla Newman, Secretary to the Search Committee, Office of Information Technology, James Madison University, Harrisonburg, Virginia 22807. Phone: (703) 568-6896 Internet· OIT_CARLA@VAX1 ACS JMU EDU

Review of applications will begin immediately and will continue until suitable applicants are identified. Preference will be given to applications received before April 30, 1993

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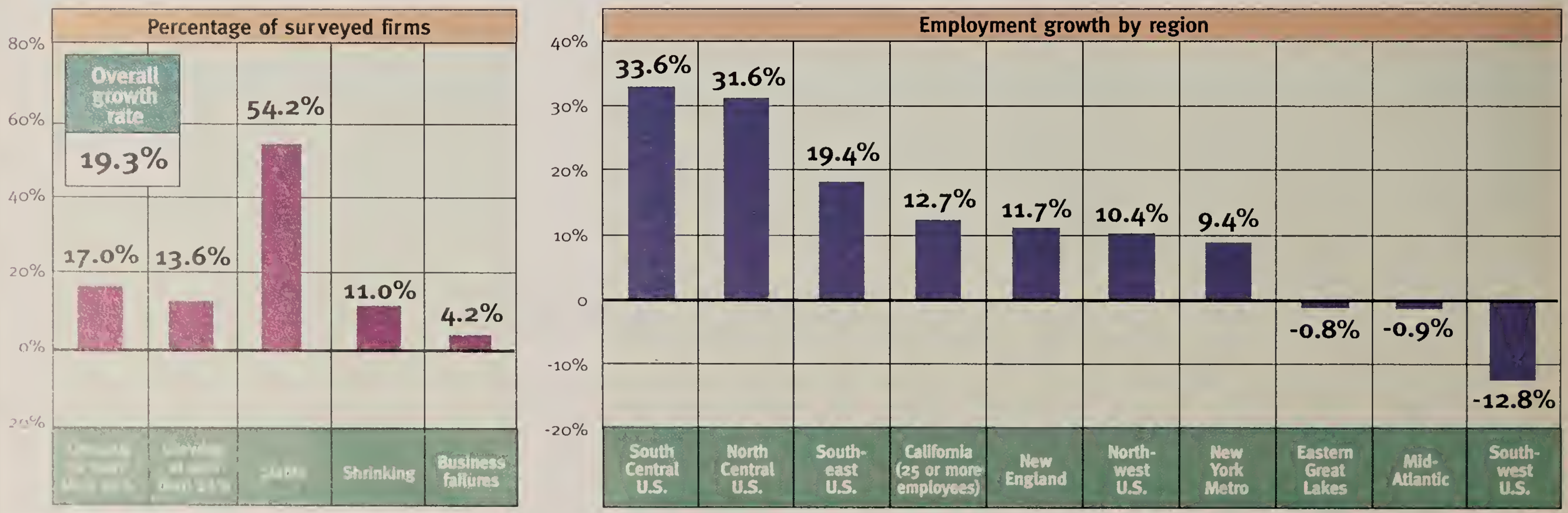

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Software upgrades can be simplified

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By Daniel Lyons

Upgrading PC software across an organization can be tricky business. If certain compatibilities are not met, formatting features such as fonts and margins could be different or not show up at all. Even worse, documents created in an earlier version may be unreadable.

Experts say there are questions you should ask yourself and your vendor beforehand to smooth the transition.

Does the new software version offer complete backward compatibility with the old version?

"Most companies are very scrupulous about backward compatibility, but some are not as scrupulous," says Jeffrey Tarter, editor and publisher of "Softletter," a software industry newsletter based in Cambridge, Mass. Even major software vendors can pose difficult compatibility issues for you.

In the old DOS days, providing compatibility with previous versions wasn't so difficult. In the graphical user interface world, however, "the problems are becoming more prevalent," Tarter says. "There are some very complex issues of display on the screen and on paper."

In the past, when you opened a database file or spreadsheet file, you didn't have to worry about display options; you just had to get the data right. Now there are fonts, screen positions, kerning and other variables coming into the documents.

Incompatibilities are application-dependent and random. Simple things such as margins, font types and other formatting features are all subject to change. In some instances, loading new applications can even alter config.sys files.

To avoid problems, it's wise to test an upgrade with a few users before deploying it across the company.

How can you ensure that all employees are using the same version of the program?

This is not easy to accomplish, and in some companies it's a nightmare. "More and more people are sharing data in networked environments, and yet you have cases where there are half a dozen versions of the same product floating around. It can be a real mess," Tarter says.

It's important to have a plan to make the new version available to all users as quickly as possible. You might consider using asset-management software to identify which versions are where on a network. Once this is done, set up goals for software standards and then upgrade.

Of course, some users won't want to give up a version they're using. The best information systems can do is make recommendations. "At our company, Quattro Pro is the preferred spreadsheet, but some people are still using Lotus 1-2-3," says Sheldon Laube, national director of information and technology at Price Waterhouse in Menlo Park, Calif. "We don't have software police."

Is there any way to get the upgrade to all users quickly and painlessly?

Vendors are looking for ways to make the deployment of upgrades less onerous. One way to lessen the burden is through software configuration management tools. Products such as Software Update and Distribution System from Boston-based Frye Computer Systems, Inc. let network managers deploy an upgrade across a network as well as upgrade all data files.

How do I justify making an upgrade?

Sometimes a single feature may be important enough to warrant a change. For example, Robert Aberg, a senior development engineer at Allied Signal Aerospace Co. in Phoenix, says his department moved to Microsoft Corp.'s Excel 3.0 because of its plotting feature. But the department balked at Excel 4.0. "We just didn't see any reason," he says.

Evaluating each new feature of each new upgrade of each new product can be a full-time job. One way to avoid it is to form long-term licensing agreements with vendors — and then automatically get every upgrade.

"We have 35,000 PCs, and trying to keep track of which machine has which version and then pay for it — it's craziness," Laube says. "You can't afford to try to figure it out."

Lyons is a free-lance writer in Ann Arbor, Mich.

Legal issues

In the past, software customers tended to strike onetime deals with software vendors. Today, customers typically form long-term relationships with vendors, says Jeffrey Ritter, a lawyer in Columbus, Ohio, and an adviser to the American Bar Association on software sales and licensing issues.

In the original license agreement, companies should include stipulations about upgrades for bug fixes as well as new features, Ritter says. Here are a few more of his tips:

▶ **Documentation.** Make sure the original license agreement requires the vendor to provide corrected documentation to go with any bug fixes that ship after the original product.

▶ **Source code.** If you negotiate to have source code held by an escrow agent, make sure that extends to source code for upgrades, too.

▶ **Warranties.** Make sure that all warranties and assurances regarding the original product also apply to any future upgrades.

▶ **Customization.** Define whether a particular upgrade is a general one or one that is specific to a customer's demands. Some vendors and customers have squabbled over ownership rights on work done to meet an individual customer's needs. —*Daniel Lyons*

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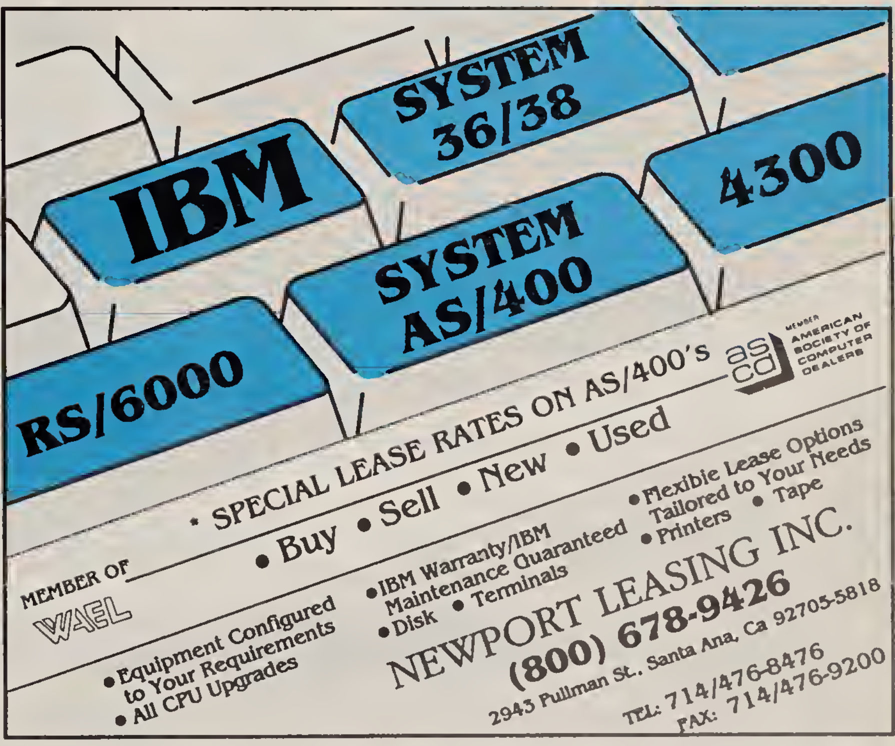

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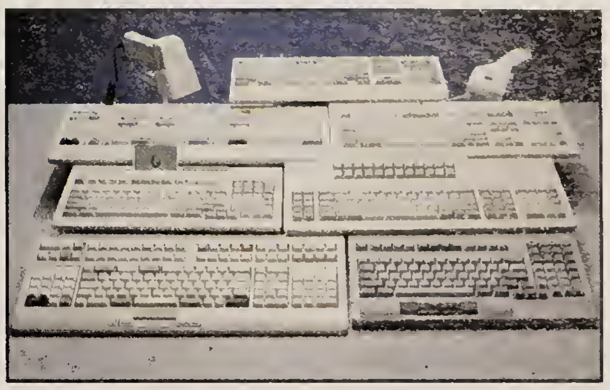

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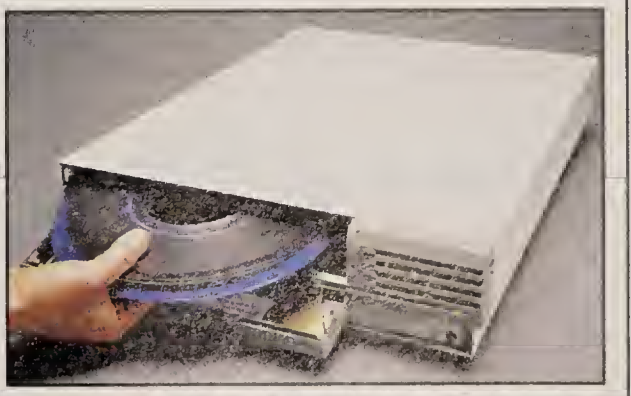

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Friday Stock Ticker

Percent

Gainers		Losers	
Quarterdeck Office Sys.	30.6	Cognitronics Corp.	-37.1
Struct. Dynamics Research	26.8	Brooktrout Technology	-24.6
Kendall Square Research	25.2	Frame Technology	-13.4
Wang Labs Inc. (B)	23.0	Microcom Inc.	-10.0
Dell Computer Corp.	18.5	Aldus Corp.	-9.3
National Semiconductor	16.5	Powersoft (H)	-8.9
Data Switch Corp. (H)	16.1	Digital Systems Int'l Inc.	-7.9
Novell Inc.	15.8	Gateway Communications	-7.9

Dollar

Gainers		Losers	
Matsushita Electronics	7.75	Cognitronics Corp.	-5.38
Dell Computer Corp.	5.75	Brooktrout Technology	-4.25
Compaq Computer Corp.	5.63	Nynex Corp. (H)	-3.75
Novell Inc.	4.75	Legent Corp.	-3.50
Microsoft Corp.	4.25	Powersoft (H)	-3.25
Kendall Square Research	4.13	Southwestern Bell Corp.	-3.13
Motorola Inc.	3.75	BellSouth Corp. (H)	-2.88
Struct. Dynamics Research	3.75	Bell Atlantic Corp.	-2.63

Industry Almanac

Mini forecast: Partly sunny

Despite the rumored demise of the mainframe and minicomputer, there are some good bets in the high-end hardware market.

A recent report by analysts John Jones Jr. and Theresa Liu at Salomon Brothers, Inc. recommends the purchase of four stocks in that sector: **Pyramid Technology Corp.** (PYRD), **Stratus Computer, Inc.** (SRA), **Tandem Computers, Inc.** (TDM) and **Hewlett-Packard Co.** (HWP). Other companies in the sector carry Hold ratings.

Jones and Liu were generally cautious regarding near-term market conditions for big-ticket hardware items. Currency exchange rates will have a negative impact on near-term revenue throughout the sector, and results in the most recent quarter, while slightly improved, still show the effects of the lagging worldwide economy, they said.

Also, according to the Salomon Brothers report, gross margins continue a downward trend as a result of competitive pressure and price cutting. Pyramid and **Amdahl Corp.** (AMH) are exceptions to that rule because of new product cycles that are just getting under way.

Stratus and Tandem are beneficiaries of **Digital Equipment Corp.**'s (DEC) cutback on research and development in fault-tolerant computing. The high cost of entry into that field shields Stratus and Tandem from some competition.

Although HP is classed with other minicomputer and mainframe stocks, the company's prospects are buoyed by strong product lines in smaller systems. HP's workstation sales grew more than 9% in 1992, and the company continues to fare well in the desktop and network printer markets.

—Derek Slater

Salomon on hardware

Current investment recommendations from Salomon Brothers, Inc. for selected hardware companies:

Company	Closing price 3/10/93	Recommendation
Amdahl Corp.	8	Hold
Cray Computer Corp.	4	Hold
Digital Equipment Corp.	45 7/8	Hold
Pyramid Technology Corp.	15 1/4	Buy
Sequent Computer Systems, Inc.	20	Hold
Stratus Computer, Inc.	34	Buy
Tandem Computers, Inc.	13 5/8	Buy

CW Chart: Michael Siggins

Exch	52-Week Range			Mar 12 3pm	Wk Net Change	Wk Pct Change
COMMUNICATIONS AND NETWORK SERVICES						**Off 0.7%**
OTC	34.63	9.63	3 COM Corp.	32.25	0.75	2.4
NYS	76.63	56.25	American Info Techs Corp.	72.75	-2.13	-2.8
NYS	59.13	37.75	AT&T (H)	57.00	0.00	0.0
OTC	3.56	0.75	Artel Communication Corp. (H)	3.00	-0.25	-7.7
OTC	24.50	10.25	Banyan Systems Inc.	20.25	1.50	8.0
NYS	56.75	40.25	Bell Atlantic Corp.	52.50	-2.63	-4.8
NYS	57.50	43.38	BellSouth Corp. (H)	53.75	-2.88	-5.1
NYS	6.75	3.63	Bolt, Beranek & Newman	4.88	0.38	8.3
OTC	18.50	10.00	Brooktrout Technology	13.00	-4.25	-24.6
NYS	92.25	42.13	Cabletron Systems	87.38	2.13	2.5
OTC	34.50	17.75	Chipcom Corp.	30.25	0.00	0.0
OTC	94.75	33.00	Cisco Systems Inc.	93.63	0.38	0.4
OTC	26.50	5.50	Compression Labs Inc.	12.75	0.00	0.0
OTC	4.06	0.88	Data Switch Corp. (H)	4.06	0.56	16.1
NYS	22.25	13.75	Digital Comm. Assoc.	19.38	-0.13	-0.6
OTC	14.75	7.00	Digital Systems Int'l Inc.	7.25	-0.63	-7.9
OTC	29.50	4.00	DSC Communications (H)	28.25	1.25	4.6
OTC	9.50	4.75	Fibronix Int'l Inc.	8.13	-0.25	-3.0
OTC	37.50	10.50	Filenet Corp.	11.25	-0.50	-4.3
OTC	4.38	1.50	Gandalf Technologies Inc.	3.38	0.06	1.9
OTC	2.06	0.69	Gateway Communications	1.81	-0.16	-7.9
NYS	10.50	2.88	General Datacomm Inds.	8.88	0.25	2.9
ASE	4.63	2.00	Go Video	2.56	0.00	0.0
NYS	37.75	28.88	GTE Corp.	36.38	0.25	0.7
NYS	78.50	62.50	ITT Corp. (H)	78.00	-0.25	-0.3
OTC	43.38	29.50	MCI Commmunications Corp.	42.38	0.88	2.1
OTC	13.50	2.25	Microcom Inc.	4.50	-0.50	-10.0
OTC	24.25	8.00	Netrix Corp.	9.00	-0.25	-2.7
OTC	19.00	9.63	Network Computing Devices	15.75	0.75	5.0
NYS	16.00	8.13	Network Equipment Tech.	8.63	-0.13	-1.4
OTC	23.25	8.00	Network General	14.50	-0.88	-5.7
OTC	15.75	8.50	Network Systems Corp.	11.38	0.13	1.1
OTC	59.25	13.63	Newbridge Networks Corp. (H)	58.38	1.63	2.9
NYS	48.00	30.50	Northern Telecom Ltd.	43.75	-1.25	-2.8
OTC	34.75	22.50	Novell Inc.	34.75	4.75	15.8
NYS	92.50	69.13	Nynex Corp. (H)	87.88	-3.75	-4.1
OTC	36.00	14.50	Octel Communications Corp.	27.25	-1.50	-5.2
OTC	8.00	3.38	Penril Data Comm Networks	4.63	-0.13	-2.6
OTC	47.25	10.25	Picturetel Corp.	23.00	-1.50	-6.1
OTC	16.25	7.00	Proteon Inc.	7.75	0.00	0.0
NYS	30.38	10.16	Scientific Atlanta Inc.	22.50	-0.50	-2.2
NYS	75.63	56.63	Southwestern Bell Corp.	72.00	-3.13	-4.2
NYS	31.13	20.75	Sprint Corp. (H)	30.00	0.88	3.0
OTC	27.00	8.75	Standard Microsystems Corp	19.50	-0.75	-3.7
OTC	18.50	6.88	Stratacom Inc.	14.75	-0.38	-2.5
OTC	95.50	18.75	Synoptics Communications	91.13	2.38	2.7
OTC	7.13	4.25	Telebit Corp.	5.13	0.13	2.5
OTC	9.38	2.13	Telematics Int'l Inc.	7.88	-0.13	-1.6
OTC	25.50	13.38	US Robotics	20.00	0.00	0.0
NYS	43.88	32.88	U S West Inc.	40.75	-1.38	-3.3
OTC	46.00	12.00	Wellfleet Communications	40.75	0.75	1.9
OTC	22.00	7.00	Xircom	9.00	0.50	5.9
PC'S AND WORKSTATIONS						**Up 1.6%**
OTC	7.50	3.00	Advanced Logic Research	3.13	-0.13	-3.8
OTC	65.25	41.50	Apple Computer Inc.	56.50	1.00	1.8
OTC	24.25	11.25	AST Research Inc.	14.63	-0.13	-0.8
NYS	16.25	4.75	Commodore Int'l (L)	5.00	-0.38	-7.0
NYS	58.50	22.25	Compaq Computer Corp.	50.63	5.63	12.5
OTC	49.88	15.00	Dell Computer Corp.	36.88	5.75	18.5
NYS	85.00	50.25	Hewlett Packard Co.	77.13	-0.38	-0.5
NYS	33.00	14.13	Silicon Graphics	30.88	0.88	2.9
OTC	41.00	22.50	Sun Microsystems Inc.	32.63	-2.50	-7.1
NYS	32.13	22.25	Tandy Corp.	26.38	0.25	1.0
NYS	9.75	5.00	Zenith Electronics	7.25	-0.25	-3.3
OTC	16.75	2.75	Zeos International Ltd.	5.13	0.25	5.1
LARGE SYSTEMS						**Up 3.1%**
ASE	18.38	6.63	Amdahl Corp.	7.88	-0.25	-3.1
NYS	14.63	4.75	Convex Computer	5.88	0.13	2.2
OTC	6.50	1.88	Cray Computer	4.38	0.38	9.4
NYS	45.00	19.00	Cray Research Inc.	28.25	-0.25	-0.9
NYS	13.88	7.13	Data General Corp. (H)	13.38	-0.13	-0.9
NYS	59.88	30.38	Digital Equipment Corp.	46.13	-0.63	-1.3
NYS	38.63	26.63	Harris Corp.	35.00	-0.63	-1.8
NYS	100.38	45.88	IBM	55.00	-0.88	-1.6
OTC	20.50	5.50	Kendall Square Research	20.50	4.13	25.2
NYS	110.00	83.00	Matsushita Electronics	95.50	7.75	8.8
OTC	17.00	6.00	Pyramid Technology	15.75	0.00	0.0
OTC	24.00	11.13	Sequent Computer Sys.	18.63	-0.88	-4.5
OTC	16.38	1.38	Sequoia Systems Inc.	2.31	-0.13	-5.1
NYS	51.50	29.50	Stratus Computer Inc.	34.25	0.75	2.2
NYS	16.88	9.88	Tandem Computers Inc.	13.25	0.13	1.0
NYS	13.88	7.75	Unisys Corp. (H)	13.50	0.00	0.0
ASE	6.38	0.06	Wang Labs Inc. (B)	1.00	0.19	23.0
SOFTWARE						**Off 0.5%**
OTC	56.50	25.25	Adobe Systems Inc.	45.50	0.38	0.8
OTC	28.75	10.25	Aldus Corp.	18.38	-1.88	-9.3
OTC	18.75	5.63	American Software Inc. (L)	6.38	-0.25	-3.8
OTC	28.00	9.75	Ask Computer Systems (H)	25.50	-0.63	-2.4
OTC	56.50	27.75	Autodesk Inc.	45.75	0.00	0.0
OTC	26.25	3.50	Bachman Info. Systems	4.06	0.06	1.6
OTC	43.00	34.00	BGS Systems Inc.	41.00	2.00	5.1
OTC	84.13	37.25	BMC Software Inc.	54.25	-1.75	-3.1
OTC	28.25	17.00	Boole & Babbage	25.75	0.50	2.0
OTC	71.50	17.50	Borland Int'l Inc.	22.75	-0.25	-1.1
OTC	8.88	3.00	CE Software	3.75	0.00	0.0
ASE	35.00	9.38	Cheyenne Software Inc.	30.50	-1.25	-3.9
OTC	19.50	8.25	ChipSoft	13.38	-1.13	-7.8
OTC	9.88	5.63	Cognos Inc.	6.75	0.00	0.0
NYS	27.38	10.88	Computer Associates	24.88	-0.13	-0.5
NYS	12.38	4.00	Computervision Corp.	5.63	0.25	4.7
OTC	18.50	6.75	Comshare Inc.	9.00	-0.75	-7.7
OTC	17.25	10.75	Corel Corp.	14.25	0.25	1.8
OTC	43.00	6.00	Easel Corp.	9.63	0.50	5.5
OTC	25.25	12.00	4th Dimension	20.25	0.00	0.0
OTC	25.50	11.00	Frame Technology	12.13	-1.88	-13.4
OTC	22.25	12.50	Group I Software	15.00	0.00	0.0
OTC	35.25	23.25	Gupta	27.00	-0.50	-1.8
OTC	8.75	3.50	Hogan Systems Inc.	7.75	-0.38	-4.6
OTC	25.75	12.25	IMRS	16.25	-0.75	-4.4
OTC	34.75	18.50	Information Resources	30.75	1.38	4.7
OTC	42.00	12.13	Informix Corp.	33.50	-1.00	-2.9
OTC	21.25	11.00	Intergraph Corp.	12.25	-0.25	-2.0
OTC	13.63	7.75	Interleaf Inc.	10.00	0.25	2.6
OTC	18.25	7.00	Intersolv Inc.	8.50	0.25	3.0
OTC	19.25	9.50	Knowledgeware Inc.	10.13	-0.38	-3.6
OTC	54.75	28.75	Legent Corp.	42.25	-3.50	-7.7
OTC	38.50	14.75	Lotus Development	26.50	-0.50	-1.9
OTC	23.00	15.50	MathSoft	18.25	-1.25	-6.4
OTC	23.25	5.50	McAfee Associates (L)	7.75	-0.50	-6.1
OTC	8.38	1.88	Meca Software	7.63	0.13	1.7
OTC	20.00	5.25	Mentor Graphics	9.38	-0.13	-1.3
OTC	46.00	27.25	Micro Focus	33.25	-0.13	-0.4
OTC	20.50	6.50	Micrografx Inc.	8.00	0.25	3.2
OTC	95.00	65.50	Microsoft Corp.	88.00	4.25	5.1
OTC	36.38	12.00	Oracle Corp.	34.38	0.13	0.4
OTC	31.88	13.13	Parametric Technology	29.38	0.38	1.3
OTC	40.50	22.50	Peoplesoft	30.13	-0.38	-1.2
OTC	11.00	3.50	Phoenix Technologies	4.75	-0.25	-5.0
OTC	40.00	29.75	Powersoft (H)	33.25	-3.25	-8.9
OTC	25.00	11.25	Platinum Technology	15.75	-1.25	-7.4
OTC	61.50	29.00	Progress Software Corp.	46.75	-1.25	-2.6
OTC	21.00	2.94	Quarterdeck Office Sys.	4.00	0.94	30.6
OTC	26.50	11.75	Rainbow Technologies Inc.	20.75	-0.25	-1.2
OTC	22.50	4.00	Rasterops	7.50	0.00	0.0
OTC	15.50	3.63	Ross Systems	12.63	-0.13	-1.0
OTC	27.25	8.50	Sapiens USA Inc.	23.25	-1.00	-4.1
OTC	26.25	6.75	Software Publishing Corp.	12.88	-0.88	-6.4
OTC	9.13	2.00	Software Toolworks Inc.	7.75	-0.56	-6.8
OTC	5.25	0.75	Spinnaker Software	2.06	-0.06	-2.9
OTC	15.00	3.25	State of the Art	12.00	0.25	2.1
NYS	23.63	13.75	Sterling Software Inc.	23.25	2.25	10.7
OTC	21.25	8.00	Struct. Dynamics Research	17.75	3.75	26.8
OTC	62.25	21.00	Sybase Inc.	59.25	0.75	1.3
OTC	48.75	5.88	Symantec Corp.	11.88	0.88	8.0
NYS	13.50	5.25	Systems Center Inc.	8.75	-0.50	-5.4
OTC	25.50	10.00	System Software Assoc.	13.00	0.25	2.0
OTC	10.13	2.50	Trinzic Corp.	4.50	-0.38	-7.7
OTC	22.75	9.13	ViewLogic Systems	19.25	1.25	6.9
OTC	23.75	8.13	Walker Interactive Systems	9.38	-0.63	-6.3
OTC	4.38	1.38	Wordstar	2.31	0.00	0.0
SEMICONDUCTORS						**Up 3.0%**
NYS	24.25	7.38	Advanced Micro Devices (H)	23.50	0.00	0.0
NYS	18.75	8.88	Analog Devices Inc.	18.75	0.88	4.9
OTC	20.13	7.63	Atmel Corp.	18.75	0.25	1.4
OTC	12.63	3.13	Chips and Technologies (L)	3.56	0.19	5.6
OTC	39.75	16.25	Cirrus Logic	28.50	2.75	10.7
NYS	16.75	7.38	Cypress Semiconductor Corp	11.25	0.50	4.7
NYS	16.13	7.00	Dallas Semiconductor	15.25	0.38	2.5
OTC	121.25	46.50	Intel Corp. (H)	117.75	0.13	0.1
NYS	13.88	4.88	LSI Logic Corp. (H)	13.88	1.38	11.0
NYS	27.75	12.88	Micron Technology (H)	27.75	1.88	7.2
NYS	64.75	36.44	Motorola Inc.	64.75	3.75	6.1
NYS	14.13	8.25	National Semiconductor	13.25	1.88	16.5
OTC	21.25	8.25	Sierra Semiconductor	13.50	0.25	1.9
OTC	38.50	22.25	SynOpsys	29.00	-2.13	-6.8
NYS	61.38	31.50	Texas Instruments (H)	61.38	2.25	3.8
OTC	10.00	6.00	VLSI Technology	7.13	0.00	0.0
OTC	7.63	2.13	Weitek	7.00	0.00	0.0
ASE	9.63	3.50	Western Digital Corp.	8.13	-0.38	-4.4
OTC	37.25	14.50	Xilinx (H)	36.13	-0.13	-0.3
OTC	27.84	12.50	Zilog Inc.	24.00	-1.13	-4.5
PERIPHERALS AND SUBSYSTEMS						**Off 0.3%**
OTC	28.75	10.38	American Power Conversion	27.25	1.38	5.3
OTC	20.17	13.67	Banctec Inc.	(s) 17.50	0.50	2.9
OTC	20.75	9.25	Cambex Corp.	11.63	0.13	1.1
ASE	18.38	6.75	Cognitronics Corp.	9.13	-5.38	-37.1
NYS	25.50	16.13	Conner Peripherals	17.63	-0.38	-2.1
OTC	38.50	10.75	Creative Technologies Inc.	31.25	-0.25	-0.8
OTC	30.75	14.25	Data Race Inc.	22.50	1.50	7.1
ASE	19.63	4.75	Dataram Corp.	8.50	0.25	3.0
NYS	28.75	7.25	EMC Corp.	25.63	0.75	3.0
OTC	10.50	5.38	Emulex Corp.	7.13	0.50	7.5
OTC	19.00	13.25	Evans & Sutherland	16.00	0.00	0.0
OTC	39.25	12.00	Exabyte	13.75	0.63	4.8
OTC	26.00	7.09	Intelligent Info. Systems	21.25	-1.00	-4.5
OTC	9.25	3.88	Iomega Corp. (L)	4.38	-0.25	-5.4
OTC	34.75	5.75	IPL Systems Inc.	6.75	0.00	0.0
OTC	24.00	10.75	Komag Inc. (H)	22.00	-1.25	-5.4
OTC	19.63	7.00	Maxtor Corp. (L)	7.13	-0.38	-5.0
OTC	12.38	7.13	Micropolis Corp.	7.75	-0.50	-6.1
NYS	109.75	85.50	3M Corp	108.50	1.25	1.2
OTC	7.75	4.00	Printronix Inc.	6.88	0.00	0.0
NYS	17.13	6.88	QMS Inc.	15.00	-0.25	-1.6
OTC	17.88	12.13	Quantum Corp.	15.00	-0.38	-2.4
OTC	12.75	3.75	Radius Inc.	5.25	0.50	10.5
NYS	16.25	7.50	Recognition Equipment	13.38	0.50	3.9
OTC	13.88	5.50	Rexon Inc. (L)	6.00	0.00	0.0
OTC	22.38	12.00	Seagate Technology	16.75	0.38	2.3
NYS	72.50	18.00	Storage Technology	25.38	1.13	4.6
NYS	25.50	16.88	Tektronix Inc.	25.50	0.88	3.6
NYS	88.88	66.75	Xerox Corp.	82.75	-0.38	-0.5
SERVICES						**Up 0.5%**
OTC	23.50	12.16	American Mgmt. Systems	22.13	1.75	8.6
NYS	5.38	3.00	Anacomp Inc.	3.75	0.00	0.0
OTC	35.75	16.00	Analysts Int'l	30.75	-1.50	-4.7
NYS	56.13	38.75	Auto Data Processing (H)	54.13	0.50	0.9
NYS	17.25	9.41	Ceridian Corp.	14.88	0.13	0.8
NYS	17.38	12.50	Comdisco Inc.	15.88	-1.13	-6.6
OTC	13.00	6.75	Computer Horizons	11.00	0.75	7.3
NYS	80.50	57.00	Computer Sciences	75.88	1.38	1.8
NYS	9.75	7.00	Computer Task Group	7.75	-0.38	-4.6
NYS	40.50	22.00	CompUSA Inc.	30.38	0.63	2.1
OTC	18.50	6.00	Corporate Software	12.00	0.00	0.0
OTC	30.75	7.63	Egghead Discount Software	7.88	-0.13	-1.6
NYS	35.88	25.25	General Motors E (EDS)	31.13	0.75	2.5
OTC	25.50	9.25	Inacom Corp.	20.75	0.13	0.6
OTC	23.50	6.25	Intelligent Electronics	14.63	-0.25	-1.7
OTC	14.38	6.63	Merisel	10.75	0.13	1.2
OTC	15.75	5.75	MicroAge Inc.	13.00	-0.25	-1.9
OTC	40.00	21.66	Paychex	38.75	-0.25	-0.6
NYS	84.88	59.75	Policy Management Sys. (H)	84.13	0.00	0.0
NYS	35.38	16.81	Reynolds and Reynolds (H)	33.63	-1.38	-3.9
OTC	31.75	22.00	SEI Corp.	29.25	-0.25	-0.8
OTC	24.38	16.88	Shared Medical Systems	22.00	0.38	1.7
OTC	14.38	5.75	SHL Systemhouse	10.38	1.25	13.7
OTC	29.25	18.25	Software Spectrum Inc.	24.00	-0.38	-1.5
OTC	33.75	20.75	Sungard Data Systems (H)	32.50	0.25	0.8
NYS	2.75	1.13	Ultimate Corp.	2.63	0.00	0.0

KEY: (H) = New annual high reached in period (L) = New annual low reached in period

Note: Banctec completed a 3-for-2 stock split.

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In Brief

Dell posts gains

Showing little impact from persisting PC pricing pressures, **Dell Computer Corp.** last week posted fiscal fourth-quarter earnings of $31.3 million, a 103% increase from the year-earlier period. Revenue rose 117% to $620 million in the period ended Jan. 31. For the year, the Austin, Texas, company posted profits of $102 million on revenue of $2 billion, up 100% and 126%, respectively, from fiscal 1992.

Gateway on the rise

Mail-order PC house **Gateway 2000** reported calendar 1992 profits of $106 million, up 77% from the year-earlier period. Revenue for the year exceeded $1.1 billion, up 76% from 1991. The privately held North Sioux City, S.D., company said it shipped about 437,000 units last year, up 75% from 1991.

Olivetti buys into EO

Ing. C. Olivetti & Co. purchased a minority stake in **EO Corp.** The Milan, Italy, firm will get a seat on EO's board and will co-market the Mountain View, Calif., firm's personal communicator in Europe. Olivetti joins AT&T, Matsushita Ltd. and Marubeni as EO's marketing and financial allies.

SHORT TAKES Internetworking vendor **David Systems, Inc.** in Sunnyvale, Calif., filed an initial public offering (IPO) of 2.5 million shares, which are expected to sell for between $7 and $8.50 a share. . . . Real-time software developer **Wind River Systems, Inc.** in Alameda, Calif., registered an IPO of 1.9 million shares, which are expected to sell for between $8 and $10 a share. . . . **Trinzic Corp.** in Palo Alto, Calif., has agreed to acquire **Channel Computer, Inc.**, a Portsmouth, N.H., developer of client/server applications, for about $8.5 million.

Time ripe for software start-up

Emprise Technologies focuses on distributed systems management

By Johanna Ambrosio

BRIDGEVILLE, PA.

Timing is everything in starting a business, and a start-up focusing on distributed systems management may be in the right place at the right time, users and industry watchers said.

Emprise Technologies, Inc., established by Glen Chatfield, a Duquesne Systems, Inc. founder, and Neal Pollon, a Legent Corp. cofounder, is working on a series of products designed to simplify tasks such as backup and security in a distributed environment.

Key to the strategy is building bridges — or acquiring products — that link systems software on mainframes to their counterparts on PCs and local-area networks.

Although companies such as Legent and Computer Associates International, Inc. are targeting distributed systems management, analysts said the market is wide open. Users who are distributing their processing are clamoring for more robust systems management tools.

Best of both worlds

"When you're running distributed systems from many locations, there are some tools that you're used to in the mainframe that you don't have in the other environments," said Jerry Laflen, vice president of computer operations at Farm Home Loan in Nevada, Mo., and a charter Emprise customer. "I guess we want the benefits of distributed computing but with the central administration of the mainframe."

That is exactly the set of issues, which Emprise is calling "intersystems management," that the company will target, said Gregory Coticchia, vice president of operations.

The approach differs from that of mainframe vendors targeting the market. "Mainframe software companies are generally extending their software to work on other platforms like PC or Unix," Coticchia said. "But most users already have these products in place on other platforms, so they want interaction between the environments, not a replacement product."

Emprise will bring out its distributed systems management product set during the next 12 months, Coticchia said. This will include alliances with "key LAN software vendors," he added, declining to elaborate.

Software allies

In the interim, the company has acquired four software packages from other small vendors to help bring in revenue as it builds and acquires its key software. Among the packages Emprise is selling is Intersend, a file-transfer utility formerly called Beamit, acquired from Soto Systems in Branson, Mo.

Another package is CICS Automated Table Systems, acquired from user American International Group, Inc. in New York, which developed the package. It automates the procedures for changing CICS applications. All told, Emprise has about 100 customers for the four acquired packages.

Igor Stenmark, a program director at Gartner Group, Inc., said Emprise "looks promising. We're waiting to see how well they'll deliver. This company is representative of companies we'll be seeing over the next year or two. As refugees from larger companies, they have the experience, the money, the contacts and the knowledge to succeed."

Nevertheless, Emprise might be ahead of some large users for distributed systems management products. Jerry Cavanaugh, manager of the information technology department at British Aerospace in Sterling, Va., and an Intersend user, said, "Right now, distributed systems management is not a hot button for us or for our business. We're using Intersend for batch file transfers, and it works just fine; but that's about all we need for now."

At a glance

Emprise, founded in Nov. 1991, has 20 employees; that number will probably grow to 40 by year's end. The company only recently announced itself to the industry because it spent the past few months building a global distribution network and acquiring products. Emprise was funded with money from its principals. The goal is to become a $3 million to $5 million company by December, eventually growing to perhaps the $100 million to $200 million range.

Integration focus paying off for restructured Bull

By Melinda-Carol Ballou

BILLERICA, MASS.

Although it is still swimming in red ink, Groupe Bull is starting to reap dividends from its tighter focus on open systems and integration services.

The company's 1992 consolidated financials, released earlier this month, show reduced operating deficits, although heavy restructuring charges kept Bull mired in losses.

There was a silver lining, however. "We cut our operating margin loss in half [to $121 million]," said Axel Leblois, president and chief executive officer of Bull HN Information Systems, Inc., the U.S. subsidiary of Groupe Bull.

Leblois said Bull's U.S. business is profitable, although he declined to give figures. He attributed U.S. profitability to a 2-year-old business unit structure, which gives individual groups profit-and-loss responsibilities and a focus on services, including systems integration.

Groupe Bull's systems integration focus — pinned heavily on helping companies migrate from proprietary to open systems — contributed to $650 million worth of revenue for professional services in 1992, or 11% of corporate revenue, according to Bonnie Digrius, a program director at Gartner Group, Inc., a market research firm in Stamford, Conn. "They're successfully making the transition to [systems integration]," she said.

Bull closed a $500,000 services deal with American Airlines last year, for example.

But while Groupe Bull is the No. 4 player in Europe for services, it is not among the Top 10 service providers in the U.S. and must "shore up its presence in what is an exceptionally aggressive market" in this country, Digrius said.

Although systems integration business climbed, total company revenue decreased (see chart). The decline was attributed to monetary fluctuations and the recession, the firm said.

Bull is losing Steve Oardner, the president of the Integris systems integration division, who will be filling a vice presidential spot at Data General Corp.

Industry analysts were positive in their assessment of the company's progress in cutting back on losses. "Whenever you start getting closer to black ink rather than red ink it's a good sign. They must be doing some things more efficiently, but they have a ways to go still," Digrius said.

Getting worse

Though Groupe Bull's fiscal '92 financials fell deeper into the red, operating margins improved

	1991	1992
Revenue	$5.93B	$5.7B
Operating margin	$(205M)	$(121M)
Write-downs	$119M	$462M
Net loss	$(585M)	$(892M)

Source: Bull HN Information Systems, Inc.

Wysiwyg

Great Names

JIM CARRIER

Director of computer technical services, who's also involved with efforts to install a global wide-area network at Fisher-Price, Inc.

WANTED: OVERACHIEVERS

IBM has hired not one but two major headhunting firms to find a new CEO, according to Sam Albert, industry observer-at-large. The "unusual" move means that IBM's next leader "will definitely hail from beyond the computer industry as well." Albert declined to speculate on who the job might go to but said the CEO-to-be will have specific traits:

Age: Early 50s

Experience: Leading conglomerates

Style: Risk-taking overachiever

COMMUTER PASTIMES

"My commute consists of a 40-minute ride on the New York City subway. I usually listen to the latest country music on my Sony DiscMan. Sometimes I read computer journals, or read up on my favorite hobby — stamp collecting. Plus, there's always entertainment on the train, such as fires on the tracks, and you get to work smelling like a log from a fireplace."

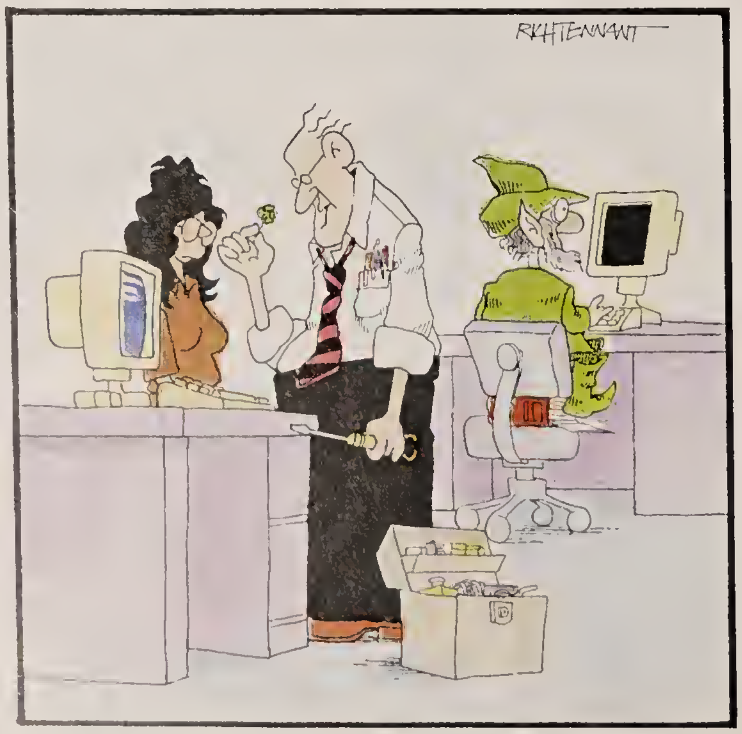
Jeff Newman
Assistant Vice President of IS
Barclays Bank, New York

"On my 15-minute commute, I press number 5 on my car stereo and listen to Goss and Garrett in the morning — a fun, morning music (light rock) and talk show."

Sheldon Laube
National Director of Information Technology
Price Waterhouse, Menlo Park, Calif.

Have any horror stories about misfired E-mail messages? We want to know about them. Call Stefanie McCann at (800) 343-6474 or fax to (508) 875-8931

The Fifth Wave *by* Rich Tennant



"HERE'S YOUR PROBLEM. SOME BOZO JAMMED YOUR KEYBOARD WITH A FOUR-LEAF CLOVER."

Inside Lines

End run

Sybase is expected to announce this week that it has found a way around Oracle's refusal to sell it an Oracle 7 license for the enhancement of Sybase's SQR report writer product. Sybase has struck a deal with Management Information Technology, a Long Beach, Calif., Oracle independent software vendor since 1985, to port the SQR product to Oracle 7. Sybase acquired the SQR report writer last year. It works with a variety of relational databases from Sybase, Oracle, Informix and IBM's DB2. SQR is already compatible with the Oracle Version 6.0 relational database.

Spit and polish

DEC is working overtime to beef up its image. Sources said President and CEO Robert Palmer presided recently over a 70-person meeting that had an important mandate: to determine the colors on the official company logo and to decide whether the "i" in "Digital" ought to retain its current squared edges or be softened to an oval shape. At the same time, more personnel cuts are likely to begin moving forward later this month, sources said.

Going west

Hitachi will today announce its entry into the U.S. E-mail market with LAN E-mail integration software. The company expects to ship directory synchronization software based on the Simple Mail Transfer Protocol in the third quarter and said it is "absolutely committed to X.500 long term." Hitachi's Computer Products unit will also demonstrate at UniForum an X.400-based network management software package on top of a Hitachi workstation built with code borrowed from Retix.

Muscling in

Controversy continues to swirl around Lexcel's Lance+, an integrated SNMP-based network management system that Lexcel officially stopped developing in January. Both Hewlett-Packard and Sun consider the Lexcel user base, which has been estimated at 250 sites, to be full of prime potential customers. HP is offering Lance+ users 35% off OpenView Network Node Manager's list price, while Sun announced last week a free upgrade from Lance+ to SunNet Manager. Meanwhile, Lexcel says it hopes to continue supporting and enhancing Lance+ through a partnership to be announced shortly.

Death reports are premature

Who says ISDN is dead? Following recent announcements of ISDN support by luminaries such as Sun and Eicon, DEC will announce Pathworks support for ISDN this week. Pathworks is DEC's strategy for integrating various desktop environments with various network operating systems, all on a VAX.

That was no technical difficulty that caused the TV screen to go blank last week during the Interactive Information Network's (IIN) broadcast of IBM's consultants meeting in Orlando, Fla. At IBM's behest, IIN agreed to pull the plug once IBM outsourcing President Sam Palmisano came to the podium to give a presentation on IBM's ISSC outsourcing subsidiary. IIN also blacked out a talk by IBM France President Pierre Hessler. The airwaves came alive again during a question-and-answer period, in which Palmisano described a lean, spartan ISSC operation. Marty Clague, an IBM consultant as well as a software and services general manager, by the way, all but confirmed that IBM's various consulting and services groups are competing with one another. Responding tongue in check to a questioner seeking delineation of the groups, Clague said the answer would depend on who's giving it. Phone, fax or CompuServe News Editor Alan Alper with news tips at (800) 343-6474, (508) 875-8931 or 76537,2413, respectively. Or try Computerworld's *24-hour voice-mail tip line at (508) 820-8555.*

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